

# The MINING CONGRESS JOURNAL

Volume 11

MAY, 1925

No. 5



## ANNOUNCING THE NEW ARMS AIR CONCENTRATOR



The latest achievement in Pneumatic Coal Cleaning devices. Sound in principle, correct in design and economical in building space, power and dollars. Permit us to demonstrate its qualities by an actual test on your coal.



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FULTON MINE CARS are built of the finest quality of materials obtainable.

WORKMANSHIP on our Cars cannot be surpassed, due to our long experience in this class of work.

Our CHILLED WHEELS, either *Plain Bearing* or *Roller Bearing*, will give you years of hard service.

We can furnish any type mine car, built to your specifications, or we can duplicate any repair parts for any type car which you may have in use.

Our prices always coincide with the prevailing market prices of materials entering into the construction of Mine Cars.

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We have not always been the trail-blazers in introducing new explosives or in improving explosives of established types. Often, however, we have been responsible for innovations that have been valuable to users of explosives.

We were privileged, a short time ago, to announce *Hercoblasting*—a new method consisting of column-loading black powder in well-drill holes and firing the charges with Cordau. It is applicable in many quarries and other operations where the column-loading of dynamite has been found economical. The effectiveness gained by this method in column-loading is, of course, not obtained in pocket-loading.

We have no faith in cure-alls or blanket recommendations; so we cannot advise you to adopt Hercoblasting without knowing your particular problems. But others have been able to effect a saving of from 20 to 40 percent by using Herco Blasting Powder in Hercoblasting, and, if you feel that we might help you by giving you the benefit of our experience with this new powder and new method, we shall be glad to do so.

The following publications will be sent free, upon request: Scientific Quarry Blasting, Hercoblasting, Modern Road Building, Safety in the Use of Explosives, Eliminating Waste in Blasting, Shot Firing by Electricity, Hercules Galvanometers & Rheostats, Dynamite: the New Aladdin's Lamp, Conquering the Earth. Address, Hercules Powder Co., 934 King St., Wilmington, Del.

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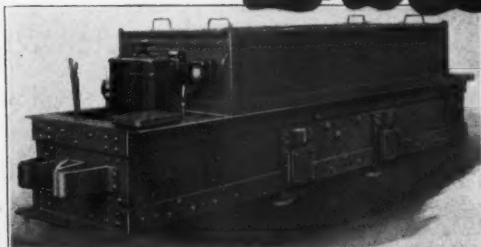
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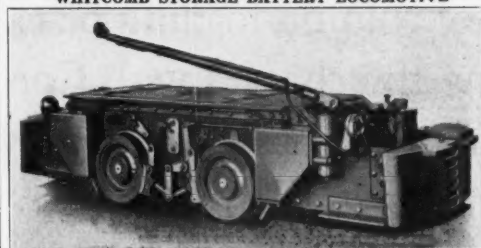
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**T**HE George D. Whitcomb Company built the first successful gasoline locomotive in 1906, and since that time has built up a highly specialized organization, devoting its entire time to the production of storage battery, trolley and gasoline locomotives, until the Geo. D. Whitcomb Company is now the largest, exclusive manufacturer of industrial locomotives in the world.

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Where the conditions are unsuited to the gasoline locomotive, Whitcomb Electric Locomotives are used. Whitcomb Electric Locomotives are made in several types—storage battery—trolley—trolley and reel and combined storage battery and trolley, each to fit a particular condition.

Electric Whitcombs are very compact and exceptionally efficient. Nineteen years of mechanical exactness has gone to make them the most reliable of haulage tools.

We have bulletins on every type of Whitcomb Locomotive and will be glad to furnish you with complete information on the type best suited to your conditions.

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GASOLINE - STORAGE BATTERY - ELECTRIC  
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LOCOMOTIVES

# THE MINING CONGRESS JOURNAL

MAY, 1925

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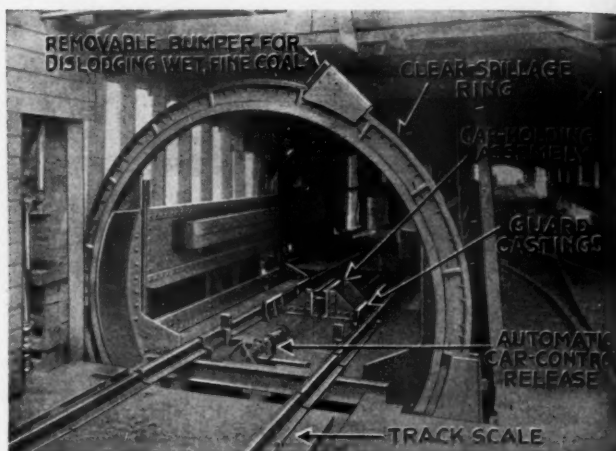
# Up-to-the-Minute Rotary Dumping

with the

## New Clear-Spillage Rotary Car-Dumper

In our new Clear-Spillage cage the ring rails are separated farther than in the older type of cage, keeping all the coal within the rings and giving really clear spillage, yet without uncoupling the cars.

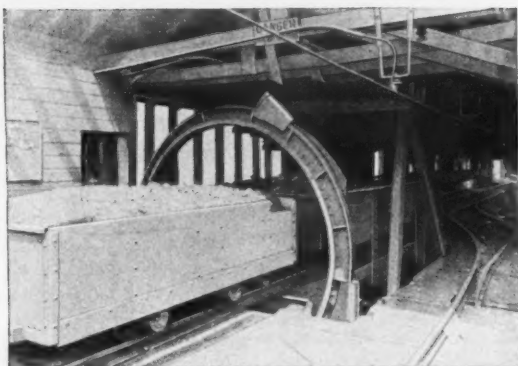
The pictures show a Clear-Spillage installation at the high-level mine of the Milburn (W. Va.) By-Products Coal Co.



Clear-Spillage Rotary Car-Dumper



Chain Type Mechanical Spragger



Box Type Solid-Body Mine Cars

Aside from the Clear-Spillage cage itself there is interest in the car control, which acts independently of the wheels and axles of the cars.

The new steel cars are of box type, giving maximum capacity within limiting dimensions. Beneath each car, attached longitudinally to the drawbar, is a heavy-section I-beam which serves all the car-control requirements and transmits the strains directly to the drawbar and the main members of the car body.

For holding the car in the cage while dumping, the lower flanges of the I-beam engage the hold-down channels between the track rails in the cage.

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About 90 percent of our business has been in rearranging old mines for the Rotary Car-Dumper, retaining in use the old cars, along with new ones of the large-capacity solid-body box type.

The Rotary Car-Dumper—turning 135 to 150 degrees and back—enables use of old three-link hitchings for dumping without uncoupling. There is no need of buying new hitching equipment. Thus we afford an old mine all the advantages of the improved Rotary Car-Dumper and our newest Car Control devices at a moderate cost.

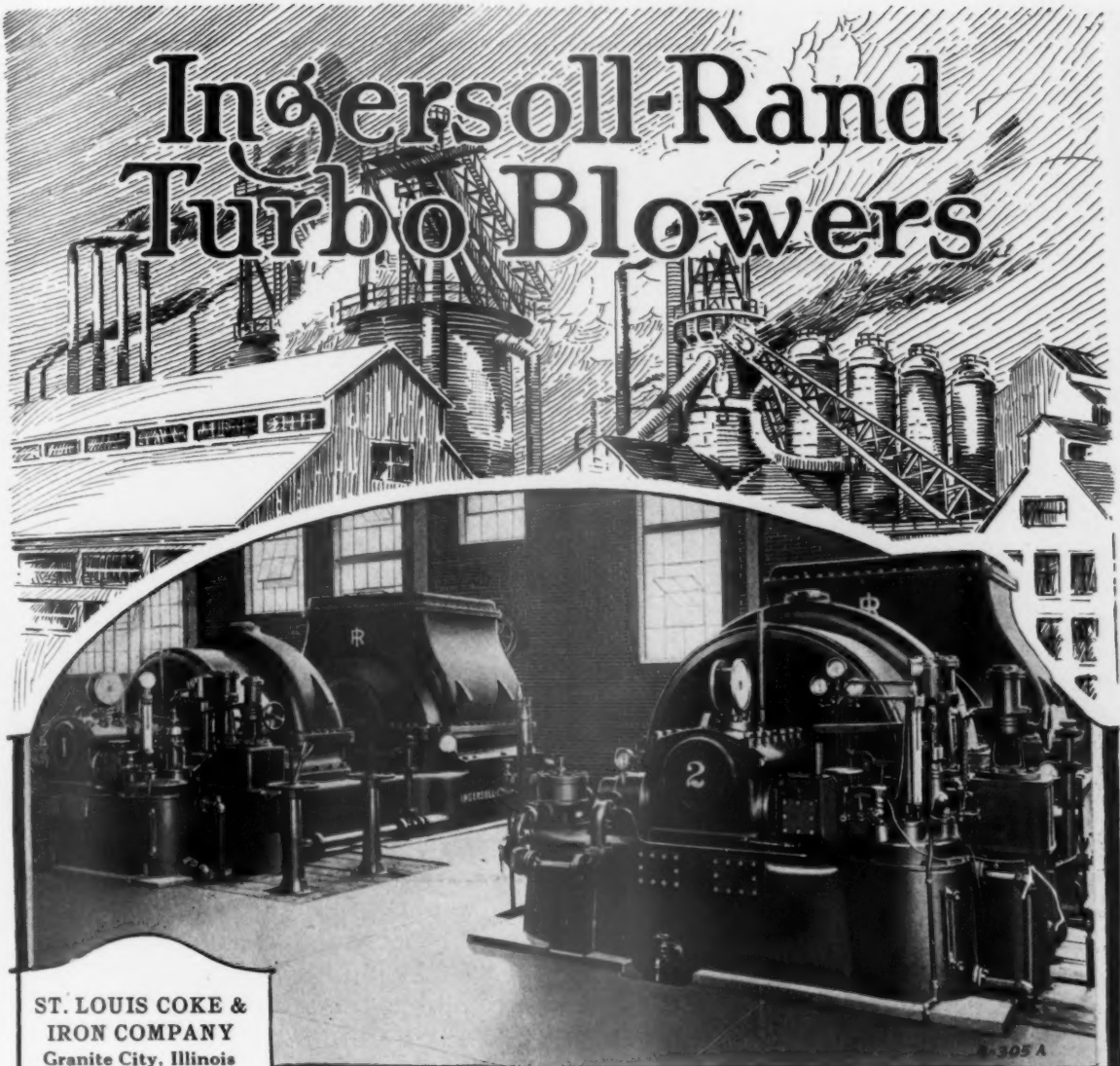
*Let us plan with you a modernization of your dumping methods.*

(68)

<b>ROTARY CAR-DUMPERS FOR MINE CARS</b> (GRAVITY, ELECTRICAL OR PNEUMATIC DRIVE)		<b>"SOLIDCAR" SELF-DUMPING CAGES</b> <b>CAR CONTROL AND CAGING EQUIPMENT</b>
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These Turbo Blowers have been in operation since the Furnace was blown in, during 1921.

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INGERSOLL-RAND TURBO COMPRESSORS are available for compressing air to a discharge pressure of 90 to 110 pounds per square inch gauge in sizes ranging from 5,000 to 10,000 cubic feet of free air per minute.

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# Ingersoll-Rand

## NOTICE

Worthington Pump and Machinery Corporation, former manufacturers of the Superior McCully gyratory crusher, brought suit against Traylor Engineering and Manufacturing Company of Allentown, Pa., claiming that the Traylor Bull Dog gyratory crusher built by the latter company is an infringement of United States patent No. 960,231.

September 26, 1923, Judge Dickinson, of the United States District Court for the Eastern District of Pennsylvania, handed down a decision sustaining above patent and holding that the Traylor Bull Dog gyratory crusher is an infringement.

On October 1, 1924, the United States Circuit Court of Appeals for the Third Circuit affirmed this decision. The Traylor Company then petitioned for a rehearing, and on December 3, 1924, this petition was refused.

The Traylor Company then petitioned the United States Supreme Court for a Writ of Certiorari to review the case, but this was denied March 9, 1925.

The District Court thereupon made its injunction effective, which was served on Traylor Engineering and Manufacturing Company on March 23, 1925, enjoining that company from further infringement by either manufacturing, selling or using crushers covered by claims of the patent.

### **Allis-Chalmers Manufacturing Co. of Milwaukee**

is the only company now licensed to manufacture under this patent and only the use of machines manufactured by Worthington or Allis-Chalmers is free from any danger of suit for infringement.

Warning is hereby given against the unlicensed manufacture, sale or use of crushers infringing the above patent.

### **ALLIS-CHALMERS MANUFACTURING CO.**

*Licensee*

March 23, 1925.



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Because of its own experience, Anaconda is peculiarly fitted to advise on the use of Trolley Wire in mine service.

Anaconda Trolley Wire is tough, strong and durable. Its conductivity is unexcelled because it is made of Anaconda Electrolytic Copper over 99.9% pure.

Five Wire Mills—at Ansonia, Conn., Waterbury, Conn., Hastings-on-Hudson, N. Y., Kenosha, Wis., and Great Falls, Mont., offer a coast-to-coast service unequalled for promptness and dependability.

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Solid or Stranded  
Bare, Weatherproof  
and Slow Burning  
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# ANACONDA TROLLEY WIRE

# Our line of MINE EQUIPMENT

*In the operation of any mine,  
ANYTHING—*

*That—Saves lost motion,*

*That—Avoids complications,*

*That—Is strong enough not to break down under the  
hardest service,*

*That—Safeguards men and equipment,*

*That—Prevents degradation or waste of the product,*

*That—Uses less power than something else of its kind,*

*That—Keeps down "overhead" by reducing the initial  
cost and the depreciation of the plant,*

*Reduces the cost of coal*

For more than 20 years we have pioneered and specialized in certain essential equipments, that will get you the above results in the operation of your mine, if you will give us the opportunity to study your problems and apply the right remedy.

*Ask for descriptive bulletins of our  
safety and cost reducing equipments*

## THE CONNELLSVILLE MANUFACTURING AND MINE SUPPLY COMPANY

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*Manufacturers of Cost Reducing Appliances*

**We are sole manufacturers of the LEPLEY:**

HOIST CAGES—all kinds, for all purposes.

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rings.

COLLAR OILING WATER AND OIL-PROOF SHEAVE  
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**MAKE** your own shale dust with the APCO SYSTEM and save MONEY.

At a large coal mine a saving of 70 percent is effected over the purchase cost of shale dust. This economy repays the cost of the pulverizer unit in 6 months.

THE APCO SYSTEM is perfected. It furnishes the most satisfactory and economical means of producing shale rock dust for mine use. Requires no preliminary crusher and shale can be pulverized without drying.



APCO SYSTEM—Patented

### COST OF OPERATION No. 15 AMERICAN PULVERIZER

Depreciation—\$3,420.00: 20 years life.....	\$171.00
*Average interest @ 6 percent— $21 \times \frac{3,420.00}{2} \times .06$ .....	107.73
Allowance for maintenance and repairs per year.....	250.00
<b>Total fixed cost per year.....</b>	<b>\$528.73</b>
Fixed cost per day—\$528.73: 200 days.....	2.64
Operator for 8 hours.....	6.86
Power cost—273 K. W. H. @ \$.0125 per K. W. H.....	3.41
Oiling costs—oil, grease, and oiling labor.....	.38
<b>Total crushing cost per day.....</b>	<b>\$13.29</b>
Crushing cost per ton of shale dust—\$13.29: 8-ton.....	1.66

### SAVINGS EFFECTED BY AMERICAN PULVERIZER

Former purchase price per ton delivered at the mine.....	\$ 6.40
Crushing cost per ton.....	\$1.66
Cost of delivering shale to crusher, per ton.....	.25
<b>Total cost of producing shale dust per ton.....</b>	<b>1.91</b>
<b>Saving per ton.....</b>	<b>\$ 4.49</b>
Saving per day—\$4.49 x 8 tons.....	35.92
Net saving per year—\$35.92 x 200 days.....	7,184.00
Percentage reduction in cost— $\frac{4.49}{6.40}$ .....	70%

\*Allowing for interest earned by depreciation reserve.

## AMERICAN PULVERIZER COMPANY

Eighteenth and Austin Streets

St. Louis, Mo.

# Our line of MINE EQUIPMENT

*In the operation of any mine,  
ANYTHING—*

*That—Saves lost motion,*

*That—Avoids complications,*

*That—Is strong enough not to break down under the  
hardest service,*

*That—Safeguards men and equipment,*

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rings.

COLLAR OILING WATER AND OIL-PROOF SHEAVE  
SHAFT BEARINGS.

**Let US Have YOUR Problems—WE May Be Able To Help You**

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	6.40

\*Allowing for interest earned by depreciation reserve.

## AMERICAN PULVERIZER COMPANY

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*For the Knowledge to be Gained* from studying their own equipment with relation to all the latest improvements and developments in coal mining machinery displayed where all can be actually examined and compared at one time

## *Here Are Six Major Topics*

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2. Mutual Adaptations of Mining Methods and Loading Machines
3. Control of Mining Equipment

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## NATIONAL EXPOSITION 0

## CINCINNATI,

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- |                                             |                                 |                                            |
|---------------------------------------------|---------------------------------|--------------------------------------------|
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ROADS

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## MAY 25-29

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AS TO THE MEANING OF  
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OR  
PAY LESS AND USE MORE?**



THE CHEAPEST PACKING IS NOT THE ONE THAT  
COSTS THE LEAST, BUT THE ONE THAT GIVES THE  
LONGEST SERVICE

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Conveyors,

Hoppers,

Shaker Screens.

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Handling Plants.

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# GRASSELLI EXPLOSIVES



## Every One A Blow At High Costs

IMPORTANT SUBJECTS TREATED in the Handbook of Standard and Approved American Coal Mining Practice include: Basic rules safeguarding electricity in mines; electric tippie equipment; underground stations (in fact all phases of automatic control of mine equipment); trolley and storage battery types locomotives; mine tracks, signals, and switches, including track gauge, turnouts, frogs and switches; mine cars; mine fans, airways and shafts and booster fans; wire rope, ladders, and miscellaneous coal handling equipment; pumps for development work, permanent pumping stations, natural drainage, and effect of mine water on equipment; loading machines, belt chain and shaking conveyors, installing and operating cutting and loading equipment; general mine timbering, preservation of timbers, and use of concrete and steel.

Every subject in the Handbook of Standard and Approved Coal Mining Practice is a blow at high costs. The subjects cover the production end of coal mines; and every subject is packed with suggestions that help you combine safety and efficiency with low cost in meeting conditions in your mine. It is the authoritative culmination of five years work on the part of 350 leading coal operators, engineers and equipment manufacturers.

The book is pocket size, loose-leaf, and will be kept up to date as recommendations are approved.

The price of this book is \$5.00. This includes a subscription to THE MINING CONGRESS JOURNAL, which carries each month a department of practical operating problems.

STANDARDIZATION DIVISION  
The American Mining Congress  
841 MUNSEY BUILDING  
WASHINGTON, D. C.

STANDARDIZATION DIVISION,  
The American Mining Congress,  
841 Munsey Building,  
Washington, D. C.

I am enclosing.....for.....copies  
of the Handbook of Standard and Approved American Coal  
Mining Methods, Practice Equipment—each order to include a  
subscription to The Mining Congress Journal.

Name .....

Street .....

City..... State.....

To put economy on a thoroughly scientific basis and to  
crop unnecessary expense from every phase of the mining  
process fill out the coupon and send it today.



## CANTON AUTOMATIC MINE DOORS



Door Open

Open Automatically  
When Trip Approaches

Close Automatically  
After Trip Has Passed

No Lost Air

No Trip Too Fast

Requires No Trapper

Over 5,000 in Use

Can Be Bought  
or Leased



Door Closed

**Reduce Your Operating Costs—Save Lives—  
Make Low Price Coal Profitable**

Canton Automatic Mine Doors require no expensive outlay like an overcast. Can be moved from one place to another with little cost. Can be installed with no interruption to operations and

**One Month's Cost Is Less Than Four Days' Trapper Pay**

*Ask for Descriptive Catalog of Labor-Saving Devices. It means money to you.*

**American Mine Door Co., Canton, O.**

2063 Deuber Ave. S. W.

A  
DOOR  
IN  
TIME  
MAY  
SAVE  
YOUR  
MINE

## HOW MUCH IS SAFETY WORTH?

**WHICH IS THE BETTER—**

To remove the man before the accident and save life and money, or—remove him after the accident and pay compensation?

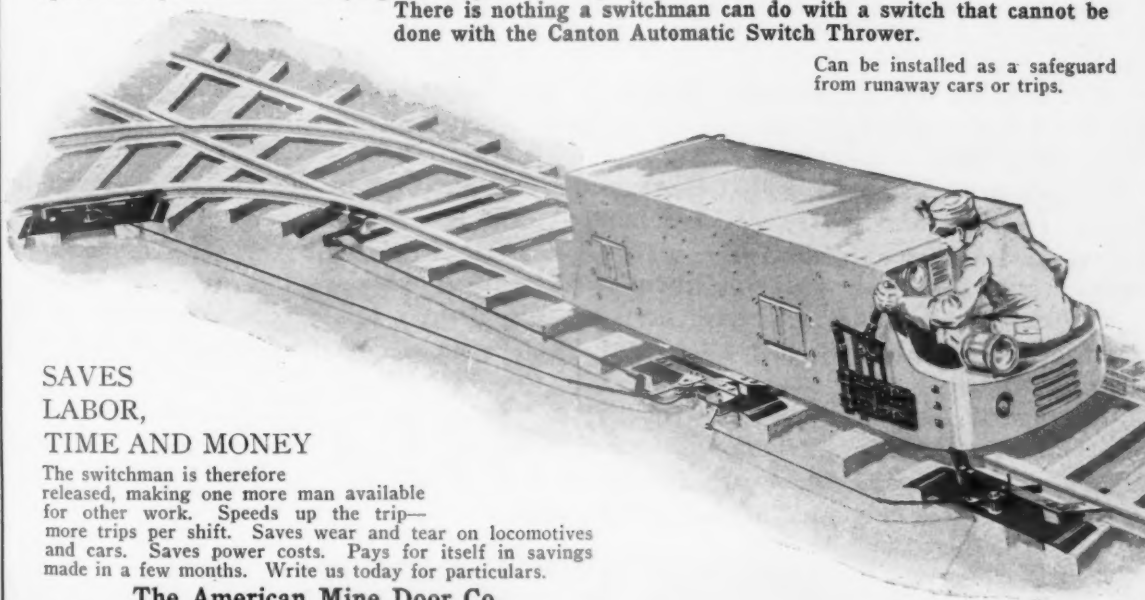
### THE CANTON AUTOMATIC SWITCH THROWER

**Saves Its Cost from 5 to 25 Times, Every Day Used—Invite Us to Prove It**

Motorman throws the switch without having to move from his seat. He is not required to slacken speed of trip. Can make a flying switch just as easily.

**There is nothing a switchman can do with a switch that cannot be done with the Canton Automatic Switch Thrower.**

Can be installed as a safeguard from runaway cars or trips.



**SAVES  
LABOR,  
TIME AND MONEY**

The switchman is therefore released, making one more man available for other work. Speeds up the trip—more trips per shift. Saves wear and tear on locomotives and cars. Saves power costs. Pays for itself in savings made in a few months. Write us today for particulars.

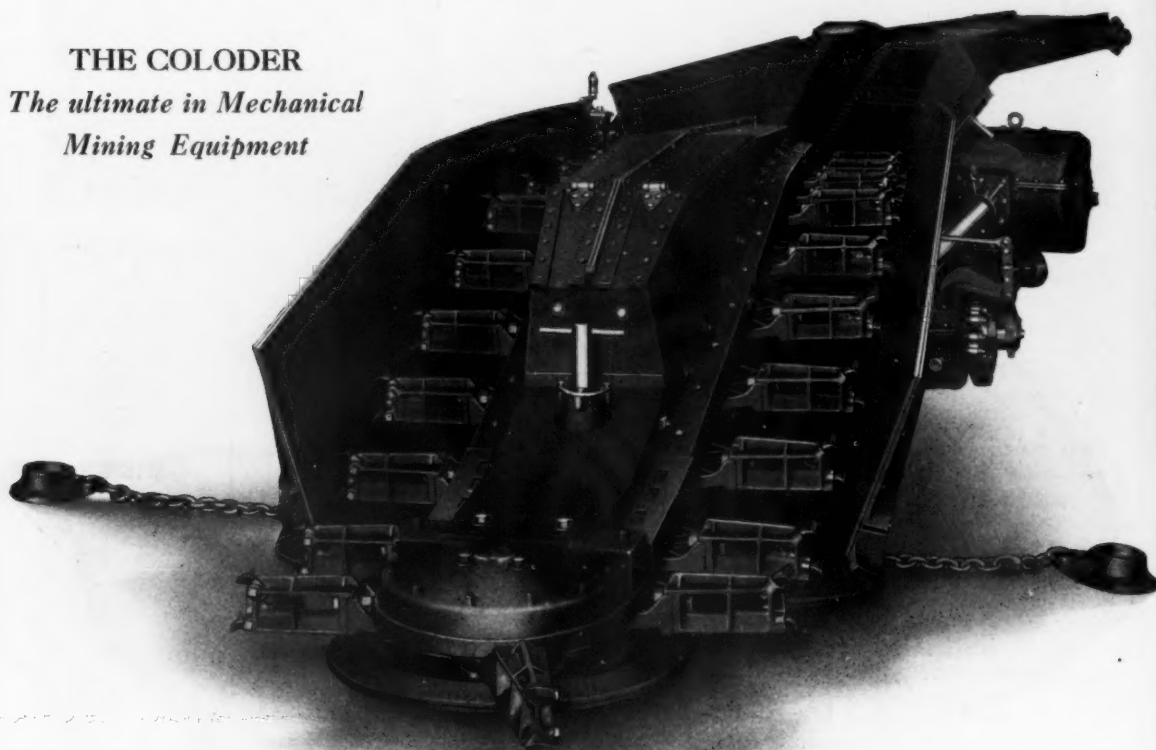
**The American Mine Door Co.**

2063 Deuber Ave. S. W.

Canton, Ohio

## **COLODERS** have proved their ability to *CUT*, and keep at a minimum mining *COSTS*!

**THE COLODER**  
*The ultimate in Mechanical  
Mining Equipment*



For a given tonnage output, Coloders reduce the *working area* by two-thirds. Thus less *track* and *trolley wire* are required. Thus *ventilation* and *drainage* are simplified. Thus *supervision* is concentrated.

Coloders load so rapidly that they assure one hundred percent *recovery* from the seam. *Pillar-robbing* is an every-day matter with Coloders. Because of the rapidity of recovery, no Coloder working place was ever *timbered* but once. And because maximum tonnage trips are always available when Coloders are at work, *haulage* costs are less.

Coloder maintenance and repair costs are surprisingly small. The *current consumption* is only .2 kilowatts for each ton loaded. *Repair parts* and their *installation* cost less than three cents a ton a year.

Considering the direct and indirect savings effected by Coloders, they are the essence of economy. Where adaptable and properly installed, Coloders are the direct road to ideal mine operation and profitable recovery.

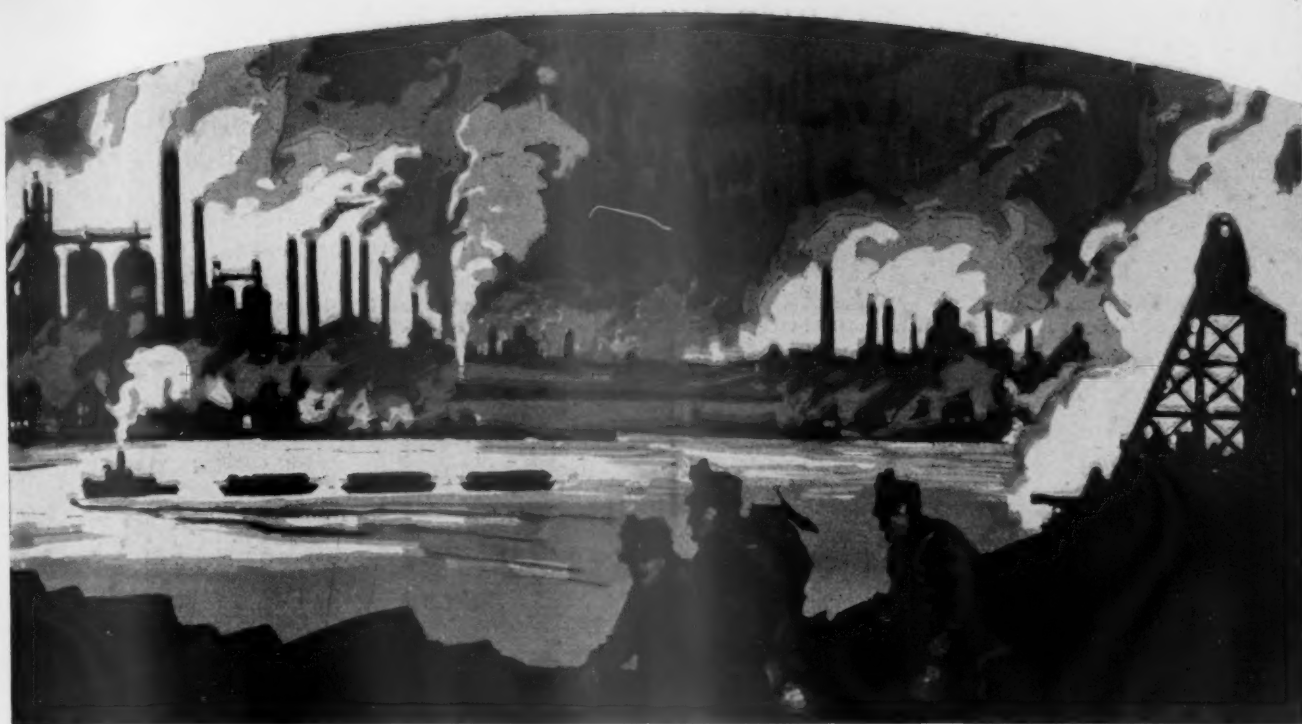
Bulletin A will be mailed to you upon request.

### **THE COLODER COMPANY**

INCORPORATED

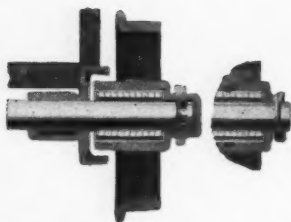
868 North Fourth Street

COLUMBUS, OHIO, U. S. A.

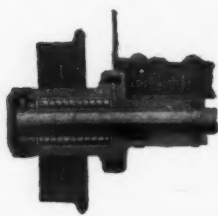


NATIONAL EXPOSITION  
of COAL MINING  
EQUIPMENT *and* MACHINERY  
CINCINNATI, OHIO  
MAY 25 *to* MAY 29

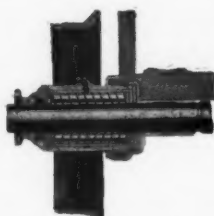
# EXHIBITORS SECTION



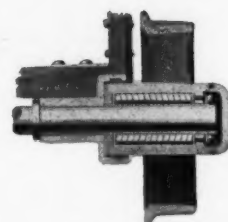
American Car & Foundry Co.  
Berwick, Pa. and Pittsburgh, Pa.



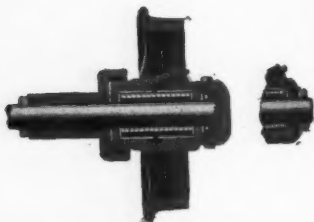
American Car & Foundry Co.  
Huntington, W. Va. & Terre Haute, Ind.



Anniston Electric Steel Corp.  
Anniston, Ala.

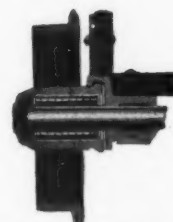
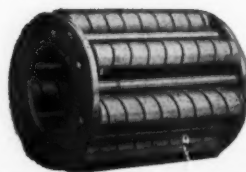


Baker Car Co.  
Harriman, Tenn.

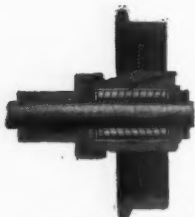


Chrisman Foundry Co.  
Morgantown, W. Va.

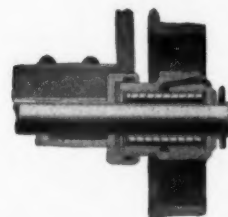
## Who's Who and The Reasons Why



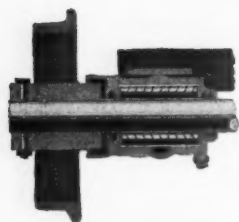
Eagle Iron Works Co.  
Terre Haute, Ind.



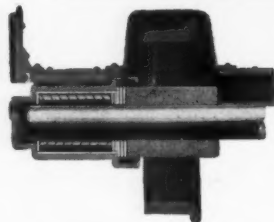
Egyptian Iron Works  
Murphysboro, Ill.



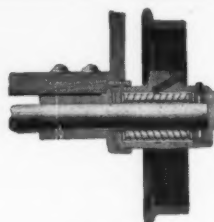
Fairmont Mining Machinery Co.  
Fairmont, W. Va.



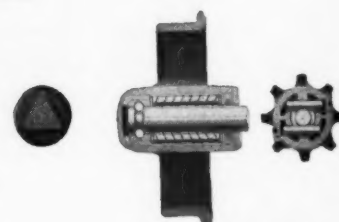
J. R. Fleming & Son Co., Inc.  
Scranton, Pa.



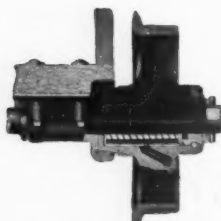
J. R. Fleming & Son Co., Inc.  
Scranton, Pa.



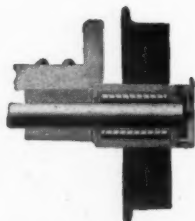
Fulton Pit Car Co.  
Canal Fulton, Ohio



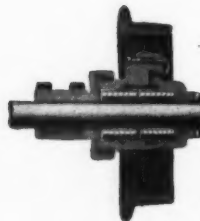
Gustafson Mfg. Co.  
Chattanooga, Tenn.



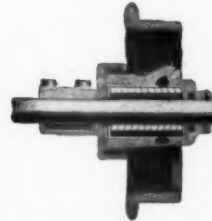
Helmick Foundry & Machine Co.  
Fairmont, W. Va.



Hercules Manufacturing Co.  
Centerville, Iowa



Hockensmith  
Wheel & Mine Car Co.  
Penn. Pa.



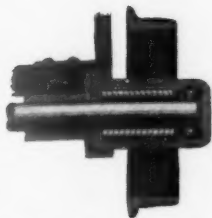
Hockensmith  
Wheel & Mine Car Co.  
Penn. Pa.

HYATT

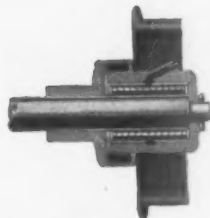
ROLLER

BEARINGS

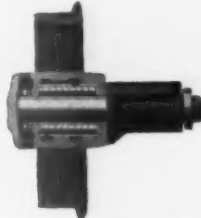




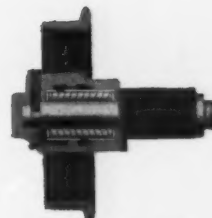
J. R. Hoe & Sons, Inc.  
Middlesboro, Ky.



Irwin Foundry & Mine Car Co.  
Irwin, Pa.



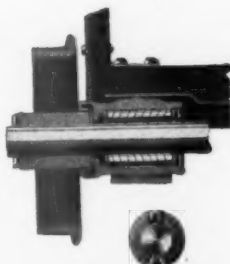
Kanawha Mfg. Co.  
Charleston, W. Va.



Kanawha Mfg. Co.  
Charleston, W. Va.



Kanawha Mfg. Co.  
Charleston, W. Va.



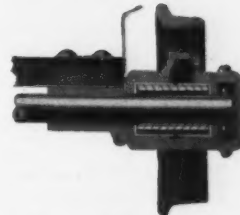
Lincoln Steel and Forge Co.  
St. Louis, Mo.

THESE designs of Hyatt bearing equipped wheels and journal boxes represent the contributions of nearly all of the leading mine car manufacturers to the cause of dependable and economical mine haulage.

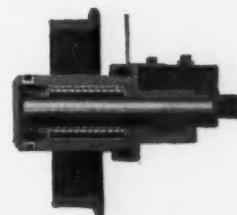
You can feel secure in buying any of this equipment. It leads in sound engineering and in record of service rendered.

Send for your copy of our mine car bulletin No. 390.

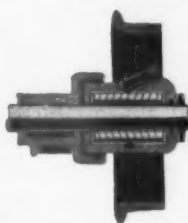
HYATT ROLLER BEARING COMPANY  
NEWARK HUNTINGTON PITTSBURGH CHICAGO  
WORCESTER PHILADELPHIA SAN FRANCISCO  
CLEVELAND MILWAUKEE DETROIT



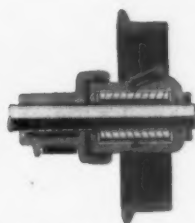
Kenova Mine Car Co.  
Kenova, W. Va.



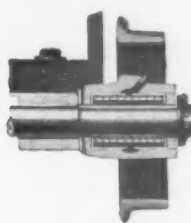
Lorain Steel Co.  
Johnstown, Pa.



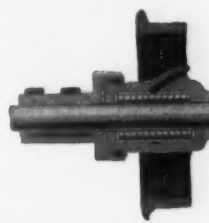
Pittsburg Boiler & Machine Co.  
Pittsburg, Kan.



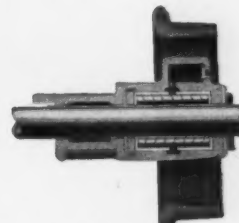
Salt Lake Iron & Steel Co.  
Salt Lake City, Utah



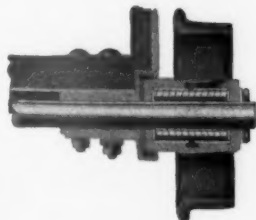
Southern Wheel Co.  
St. Louis, Mo.



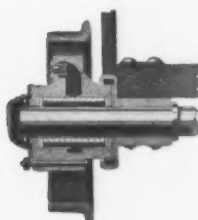
Star Manufacturing Co.  
New Lexington, Ohio



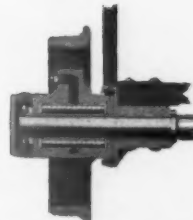
United Iron Works  
Kansas City, Mo.  
Pittsburg, Kan.



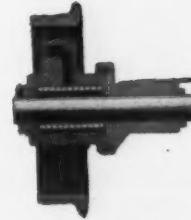
Young Car Co.  
Evansville, Ind.



Watt Mining Car Wheel Co.  
Barnesville, Ohio



Watt Mining Car Wheel Co.  
Barnesville, Ohio



Watt Mining Car Wheel Co.  
Barnesville, Ohio

FOR

MINE

CARS

# The Jeffrey Company's



(Patents pending)

## 43-A SHORTWALOADER—A combination Shortwall Coal Cutter and Loader

Has a cutter bar the same as a shortwall machine. Back of this is a conveyor which picks up and carries away the cuttings. The swinging conveyor on the back end loads coal into a sectional conveyor which carries it to cars in the nearest entry.



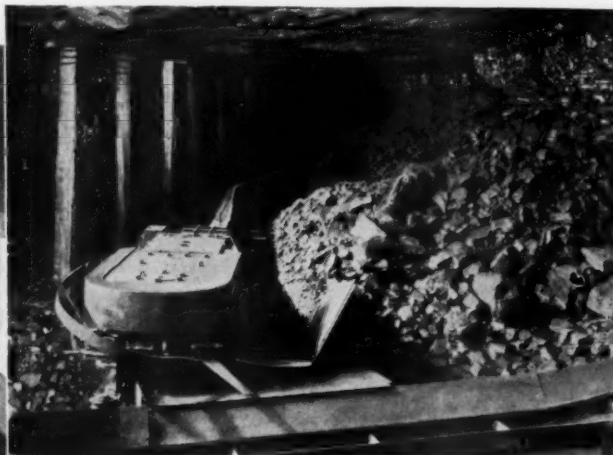
**SHORTWALOADER** in position to make cut. The two top cutters are folded back along the sides of the machine.



(Patents pending)

## 47-A SECTIONAL CONVEYOR.

Designed to take coal away from loading machines. Speeds up production and eliminates trackage.



(Patents pending)

## 44-A CONVEYOR-LOADER.

A self-loading conveyor-loader for use on faces 100 feet or more in length.

# JEFFREY

# Greatest Contribution to the Mining Industry

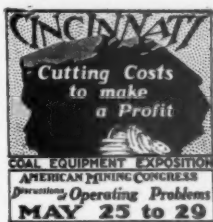
**A** NEW LINE OF MACHINERY that meets the requirements of practically any system of mining.

A development that typifies our many years of effort to serve industry and the public through the manufacture of time-saving and labor-saving machinery, which not only enables the mine operator to increase output and profits, but eliminates drudgery for the mine worker, and results in cheaper and better fuel for the consumer.

Operators are realizing that in order to produce coal economically it must be loaded mechanically; and that in order to make mechanical loading a success, mining systems must be arranged so that loading machines stay in the same place shift after shift.

The various units comprising the new line of equipment will be fully described in detail in succeeding issues.

As a mining man who keeps abreast of all modern developments, you cannot afford to miss a single advertisement.



Call at Booths Nos. 54-55-56 and get complete information concerning the Jeffrey Line of Coal Mining Equipment.

The new loading machines may be seen in operation at our Columbus plant, only a few hours ride from the Exposition.

**The Jeffrey Mfg. Co., 958-99 North Fourth St., Columbus, Ohio**

New York.....30 Church St.  
Philadelphia...515 Real Estate Trust Bldg.  
Pittsburgh.....600 Second Ave.

Scranton, Pa....518 Union Nat'l Bk. Bldg.  
Charleston, W. Va.....914 Kanawha St.  
Chicago.....858 McCormick Bldg.

Denver.....1639 18th St.  
Salt Lake City.....508 Newhouse Bldg.  
Montreal, Canada .....Power Bldg.

Fairmont, W. Va.....Fairmont Hotel Bldg.

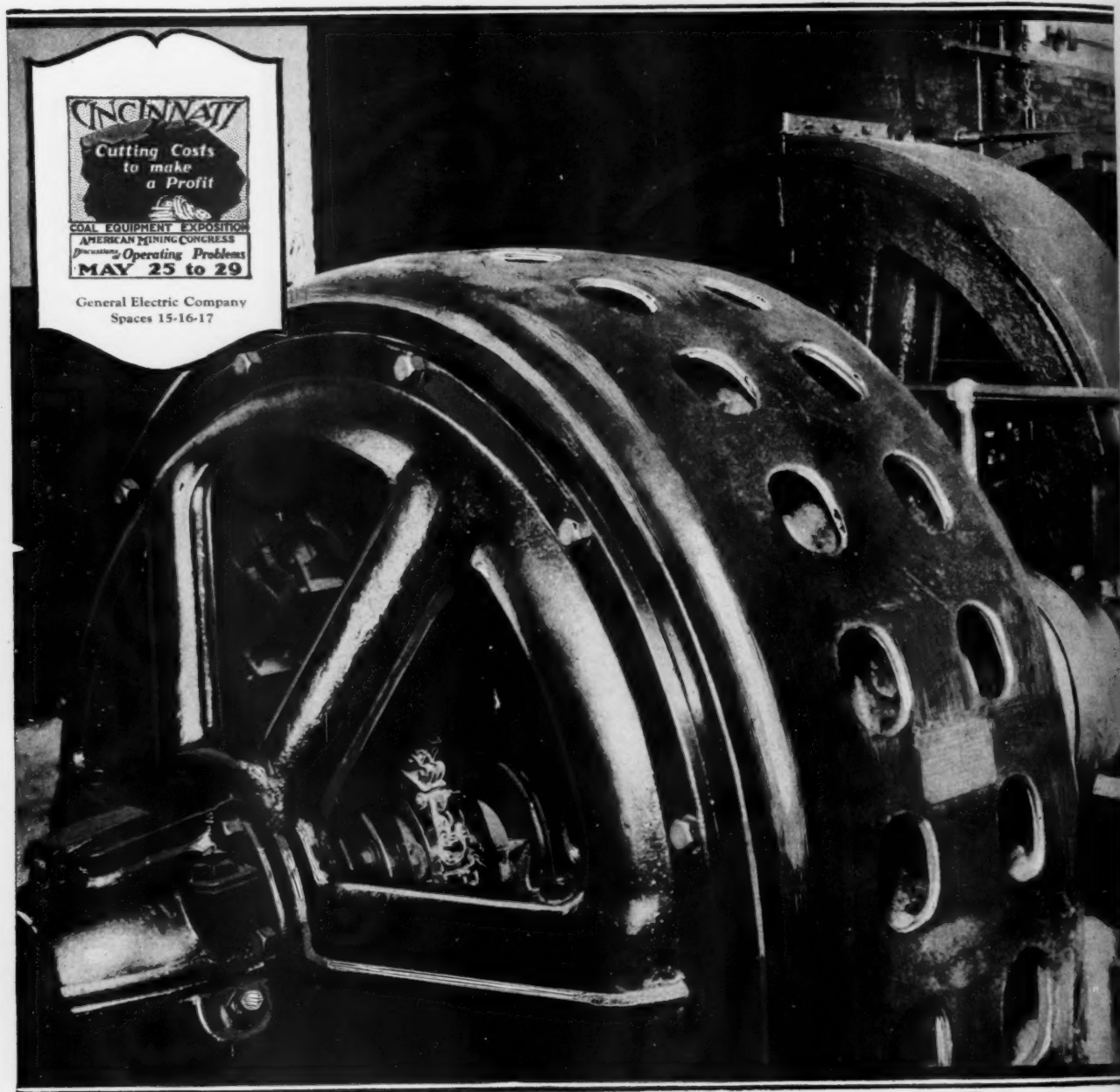
Sales and Service Stations  
Pittsburgh.....600 Second Ave.

Terre Haute, Ind. ....319 Cherry St.

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# Coal Mine EQUIPMENT

# Modern Hoisting is an



**CINCINNATI**  
Cutting Costs  
to make  
a Profit  
COAL EQUIPMENT EXPOSITION  
AMERICAN MINING CONGRESS  
Discussion of Operating Problems  
**MAY 25 to 29**

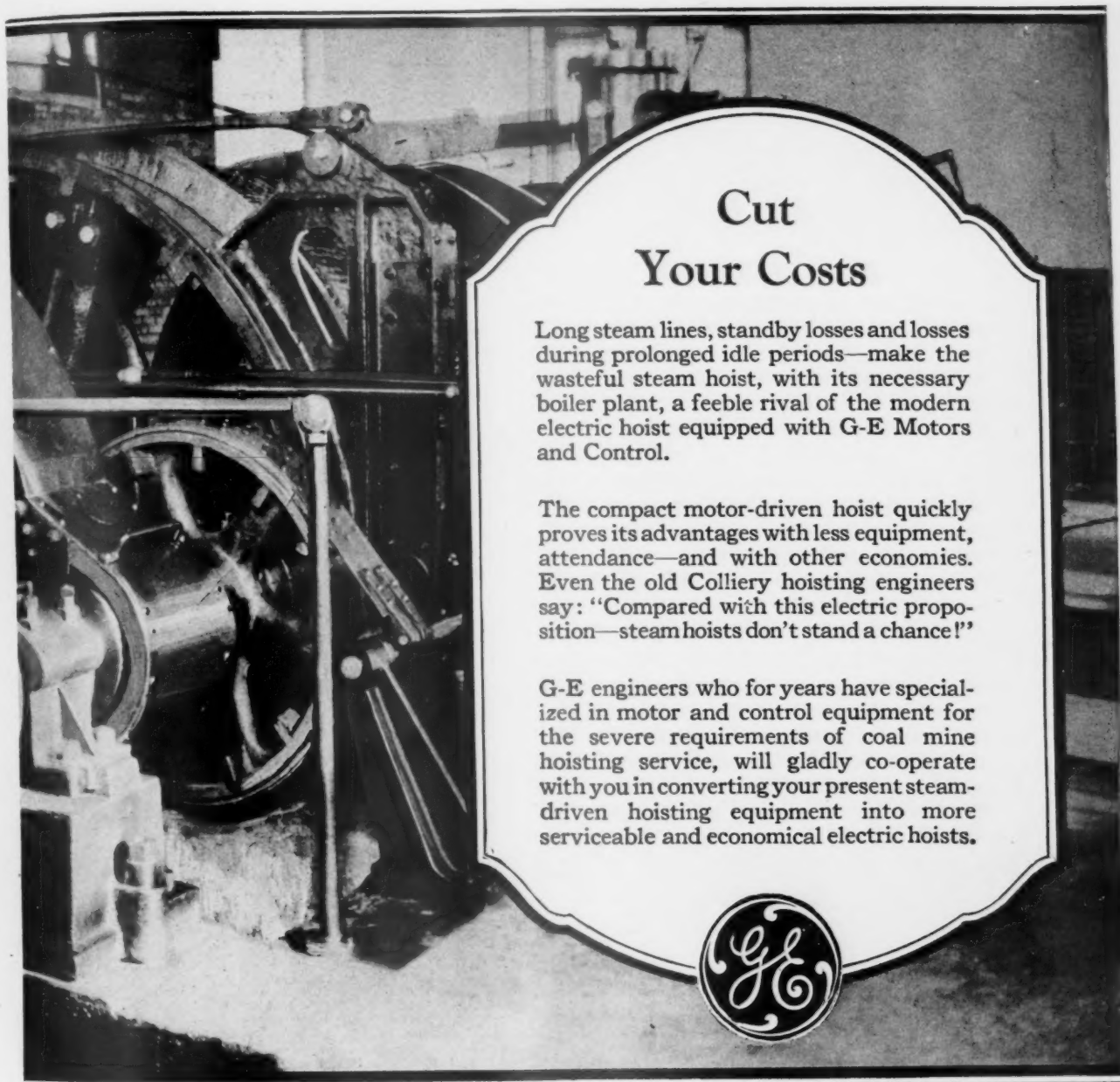
General Electric Company  
Spaces 15-16-17

# GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK



# Electrified Operation




**Cut  
Your Costs**

Long steam lines, standby losses and losses during prolonged idle periods—make the wasteful steam hoist, with its necessary boiler plant, a feeble rival of the modern electric hoist equipped with G-E Motors and Control.

The compact motor-driven hoist quickly proves its advantages with less equipment, attendance—and with other economies. Even the old Colliery hoisting engineers say: "Compared with this electric proposition—steam hoists don't stand a chance!"

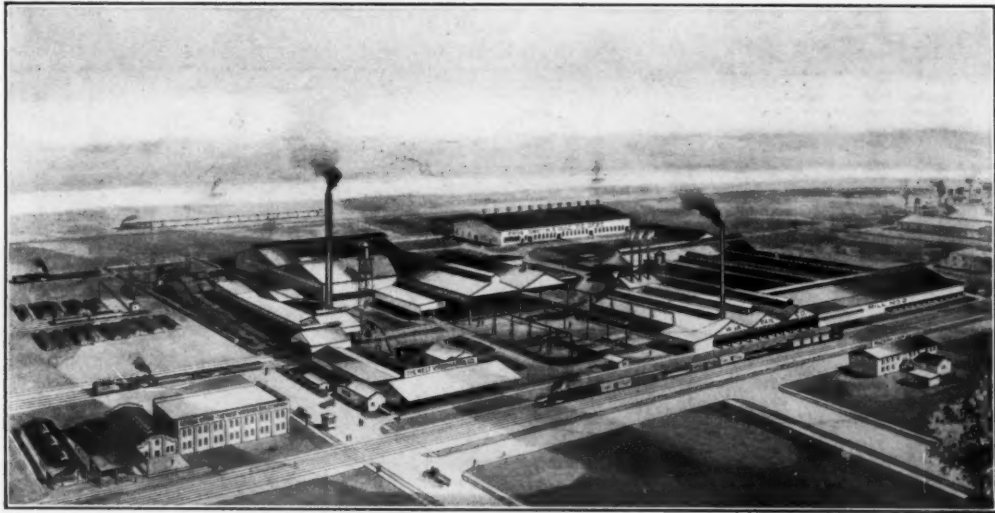
G-E engineers who for years have specialized in motor and control equipment for the severe requirements of coal mine hoisting service, will gladly co-operate with you in converting your present steam-driven hoisting equipment into more serviceable and economical electric hoists.



# ELECTRIC

SALES OFFICES IN ALL LARGE CITIES

7A-55



## ***West Virginia Rails and Track Work Mean a Saving for You***

We manufacture a complete line of track material—Rails, Accessories, Mine Ties, Frogs, Switches, Guard Rails, Steel Turnouts, Etc., and can ship you your entire requirements in carloads. You get the saving in freight, get your material in one lot and save expensive delays. All standard equipment carried in stock for immediate shipment. May we quote on your requirements.

*Ask for our trackwork bulletin—just out*

**The West Virginia Rail Co., Huntington, W. Va.**



## A Tie for Every Purpose



Design No. 6

*A rugged but convenient tie for universal service*



Design No. 5

*A tie designed to especially meet the needs of those who desire to ball the jumper rail. Note how the clip holds the rail securely in place*

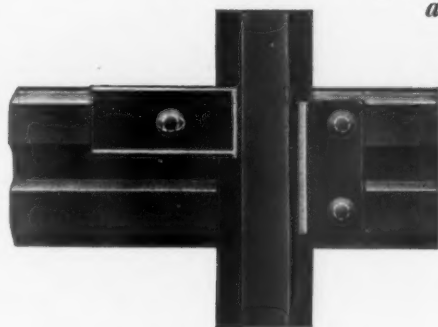


Design No. 7

*This tie with the clips placed alternately is designed to permit of easy installation in existing track. By merely sliding the tie under the rails, raising, moving slightly so that fixed clips engage the rail flange and hammering the rotary clip a quarter turn, it is put into use. By reversing the procedure ties may be easily removed from the track*

## West Virginia Mine Ties —

*are made to meet any needs*



**For new track—For “balling” jumper rails  
For easy installation in existing track**

Hammer the rotary clip. That's all you have to do to fix the rail to the West Virginia Steel Tie. A certain one of our three designs may be best adapted to your needs, but they are all rugged, convenient and hold the rails in place. No tipping or spreading of rails. Pressure on rails cannot loosen the tie.

West Virginia ties are quickly installed and reinstalled. They are easily carried. They save head room. They are shock resistant and rigid.

Complete facts about West Virginia products sent to you immediately upon your request.

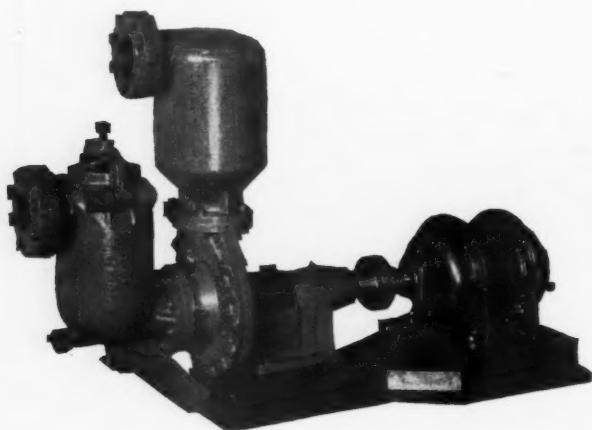


See our exhibit at Cincinnati—May 25-29

**The West Virginia Rail Co., Huntington, W. Va.**



# Valves PUMPS—PIPE Fittings



## THE La BOUR SELF-PRIMING CENTRIFUGAL PUMP

IT PUMPS AIR

For Mine Gathering  
Sump or Heading

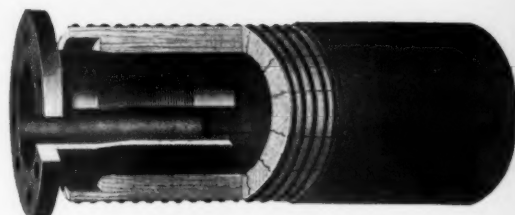
Capacities up to 300 G. P. M.

Water End of Iron, Bronze or Lead

Connect your Pumps and Flanged Fittings  
to Wood Pipe properly by using

## HARRIS WOOD PIPE CONNECTORS

Furnished in  
Bronze, Lead, Iron or Chrome Iron  
Flanged or Screwed



PATENT APPLIED FOR



USE YOUR PUMPS for WATER,  
Not for Coal or Dirt

BY USING

## THE HARRIS LOW-DOWN SOLID BOTTOM SUCTION STRAINER

Sizes 1½ inches to 4 inches

IRON OR BRONZE

## DEMING "OIL-RITE" AND OTHER MINE PUMPS

Centrifugal Pumps for Every Service—Priming Units—Multi-Port Valves—Bore  
Hole Stubs

# Harris Pump & Supply Company


320 Second Avenue

Pittsburgh, Pa.

"When You Want Pumps - Call Harris"

*Valves*———PUMPS - PIPE———*Fittings*





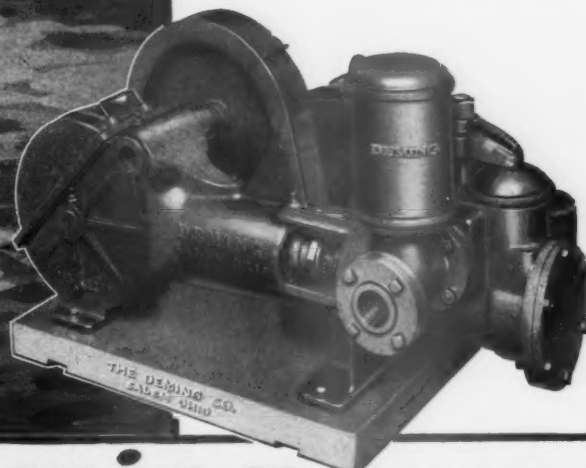
# FLOOD WATER!

**Are You Prepared to Fight It?**

**I**N the rainy season, the menace of flood water brings sleepless nights to many mine operators. One sure method of keeping this menace out of your mine and out of your mind is to put a Deming Mine Pump on guard.

The "Jupiter" Deming "Oil-Rite" double-acting piston pump can be depended upon for years of faithful service. A four page bulletin will introduce you to "Jupiter." Its specifications and construction will convince you it is a pump worth knowing and owning!

**THE DEMING COMPANY • SALEM, OHIO**  
ESTABLISHED 1880



THE DEMING CO.  
SALEM, OHIO

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McComb Supply Co.
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English Bros. Machinery Company
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Laib Company
- ST. LOUIS**  
Reeves & Skinner Machinery Co.
- PITTSBURGH**  
Harris Pump & Supply Co., 316 Second Ave.

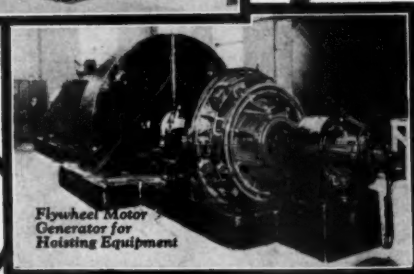
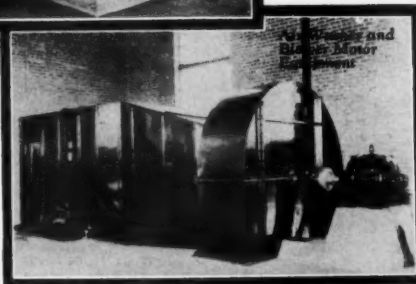
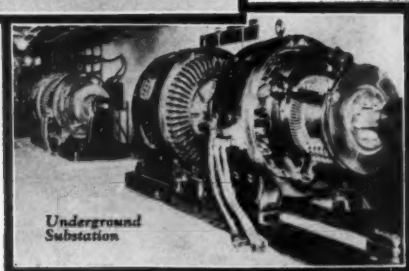
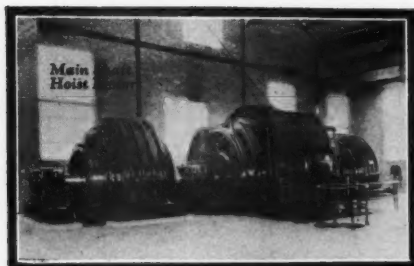
# Deming MINE PUMPS



# Largest and Finest

is

## Westinghouse Equipped



THE New Orient Mine of the Chicago, Wilmington and Franklin Coal Company, the largest and finest coal mine in the world, is fully electrified—with equipment nearly 100% Westinghouse.

By using only the most modern electrical equipment, this mine is able to handle a large tonnage of coal speedily and economically.

The New Orient has the distinction of operating the largest hoist motor in the world. This motor, also, was built and installed by Westinghouse.

See our exhibit at the Cincinnati Exposition.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh Pennsylvania  
Sales Offices in All Principal Cities of  
the United States and Foreign Countries

### Westinghouse Equipment in The New Orient Mine

#### Hoist Equipment:

- 2—1650 kw. Type Q Generators
- 2—2000 hp. Type QM Shunt Motors
- 1—2200 hp. Type CW Motor

#### Substation:

- 9—300 kw. Motor Generators
- 1—500 kw. Motor Generator

#### Transformers:

- 6—500 kv-a Transformers

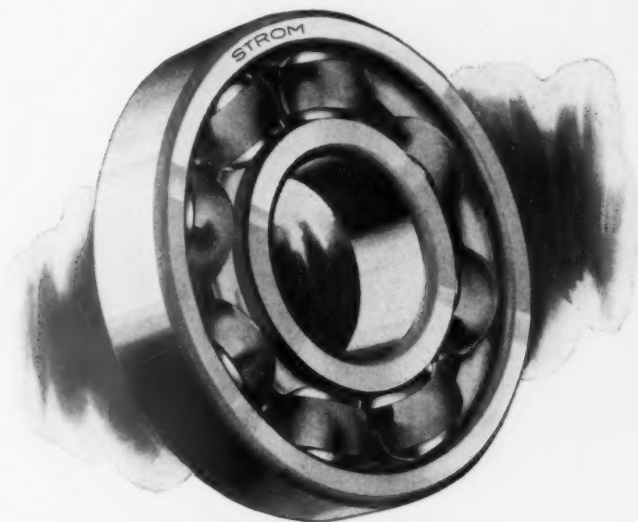
#### Motors for Pumps, Fans and Tipples:

- 2—7.5 hp. d-c. Motors
- 1—30 hp. d-c. Motor
- 38 a-c. CS Motors, 2 to 300 h.p.
- 20 a-c. CW Motors, 3.5 to 400 h.p.
- Total—61 Motors—1789 hp.



# Westinghouse

SEE THE STROM EXHIBIT AT BOOTH NO. 70

*New!*

# The Super-Strom

*An important development in ball-bearings for coal mining equipment*

Coal mining engineers are finding the new Super-Strom Ball Bearing has outstanding advantages for use in motors, loading equipment, hoisting machinery and locomotives.

For the Super-Strom offers increased load-carrying capacity—as much as 38 per cent higher in some sizes—radial, as well as thrust in both directions. It has deep grooves, no filling slot and more or larger balls according to size of bearing.

Made of special analysis steel and not merely case-hardened but hardened **throughout** to insure elasticity and longer life. Balls are held to limits of size and sphericity just one-half that required for the ordinary ball-

bearing. Retainers are of pressed steel, rigidly riveted, with accurately formed ball-pockets. All boundary surfaces ground to exceptionally close dimensional and eccentricity tolerances.

Super-Strom Ball Bearings are now available in quantity production—with the Strom service behind them.

See the complete Strom line as used in coal mining installations at the National Exposition of Coal Mining Equipment and Machinery at Cincinnati, May 25-29. Exhibit, Space No. 70. You can appreciably cut down operating costs with Strom Ball Bearing equipment. Write for facts.

*Tear off lower part of this advertisement and pin it to your letterhead. We'll mail at once this important booklet on the new Super-Strom ball bearing.*

# Strom

**BALL BEARINGS**



STROM BALL BEARING MFG. CO., 4558 PALMER STREET, CHICAGO, ILLINOIS

Name.....Position.....



**M**OST wire ropes look alike, but what a difference in results. In mining, exceptional conditions exist which must be met by the use of wire rope possessing exceptional qualities.

Roebling Blue Center Steel Wire Rope possesses these qualities. The wires are made of a superior

grade of steel produced in our own furnaces. Every detail of its manufacture, from the ore to the fabricated rope, is under the control of our own skilled supervisors.

Exacting tests are made at frequent intervals, during the process of manufacture, to insure uniformity, toughness and durability.

Send for catalog A-500

John A. Roebling's Sons Company, Trenton, N. J.

New York	Boston	Chicago	Philadelphia	Pittsburgh	Cleveland
Atlanta	San Francisco	Los Angeles	Seattle	Portland, Ore.	







*Du Pont chemical engineers insure uniformity of quality by chemical control through every step of manufacture from raw material to finished product.*

**Du Pont explosives have been *standard* for one hundred and twenty - three years.**

**E. I. du Pont de Nemours & Co., Inc.**  
*Explosives Department*  
Wilmington, Del.



*You will be welcome at the du Pont Exhibit at the Cincinnati Exposition of Coal Mining Equipment, Booth Number 39*

# Are You Headed for Cincinnati?

*National Exposition  
Coal Mining Equipment and Machinery*

**May 25-29**

Discussion of practical operating problems, in open meetings—helpful interchange of ideas—will bring returns in lower costs of coal operation.

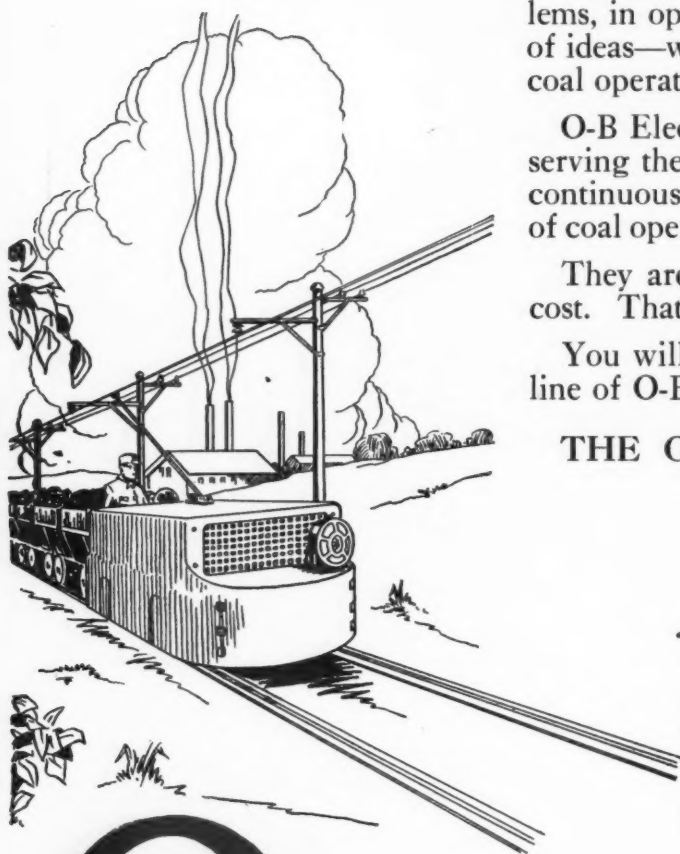
O-B Electric Haulage Materials efficiently serving their function of keeping haulage in continuous operation also help to lower costs of coal operation.

They are high in value—and low in final cost. That is the only measure of economy.

You will find us at Cincinnati with a full line of O-B fittings for your examination.

**THE OHIO BRASS COMPANY**

MANSFIELD, OHIO



**(B)**

- Trolley Hangers
- " Clamps
- " Switches
- " Frogs
- " Connectors
- " Wheels
- " Harps
- Roof Drills
- Porcelain Insulators
- Headlights
- Rail Bonds
- Welding Machines

**(B)**  
**PRODUCTS**



S.S. BEECHPARK loading at Port Covington Pier of the Western Maryland Railway, Baltimore, Md.

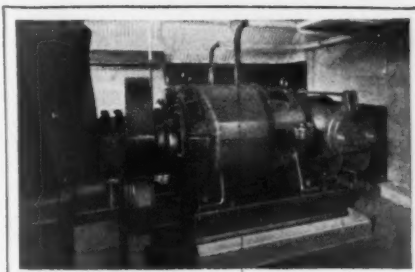
## Where reliability is essential

FORTY coal cars, each of 100-ton capacity, can be dumped each hour at the Western Maryland Railway's new Port Covington Coal Pier, Baltimore. And at times this guaranteed capacity of the equipment must be reached within a fraction of a minute, that rails may be kept clear and steamers sail on time.

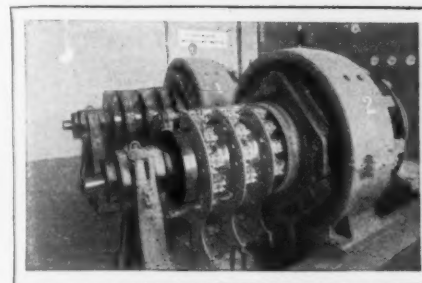
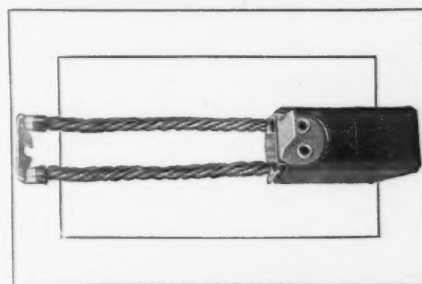
Here freight cars are lifted bodily and dumped as easily as you would a bucket. This giant mechanism must be able to leap to the peak of performance at a moment's notice. For the sake of the constant readiness and complete reliability that are so precious, every operation is electrically performed.

The electrical equipment on this pier is fitted throughout with National Pyramid Brushes, on hoists, elevators, even on "the mule." Clouds of coal dust may sweep the motors and converters; fog may roll in from the harbor; but these brushes recognize no master save electricity.

Our Sales Engineers are always at your service.



The mule that never bites, kicks or balks. It pushes heavy coal cars up a steep grade to be dumped.



A 750 KW, 250-volt rotary converter at Port Covington.

Manufactured and guaranteed by

NATIONAL CARBON COMPANY, INC.  
Cleveland, Ohio Carbon Sales Division San Francisco, Cal.

Canadian National Carbon Co., Limited, Toronto, Ontario

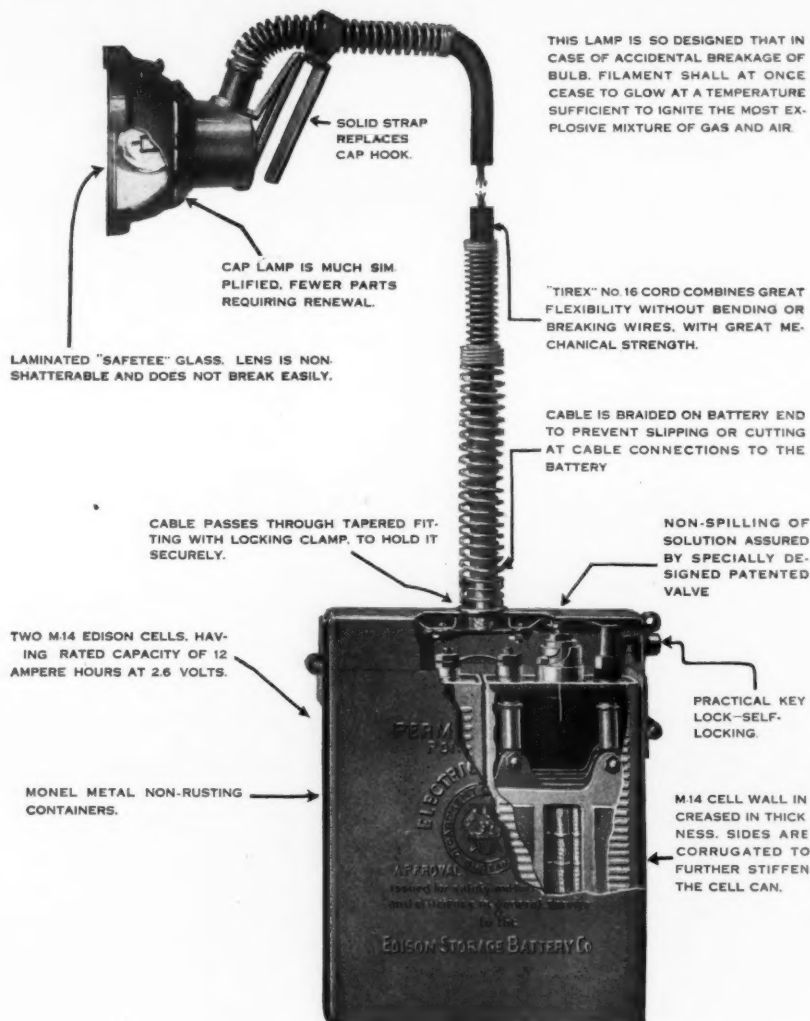
Emergency Service Plants

PITTSBURGH, PA.  
Arrott Power Bldg. No. 3, Barker Place  
Phone: ATLantic 3570

CHICAGO, ILL.  
551 West Monroe St.  
Phone: STAte 6092

NEW YORK, N. Y.  
357 West 36th St.  
Phone: LACkawanna 8153

## The New Edison: Many Remarkable New Features Explain its Efficiency and Long Life



The New Edison provides a clean powerful light of 6 candle power. It burns for 12 continuous or intermittent hours without attention.

Send for Bulletin No. 101 for additional information on the New Edison

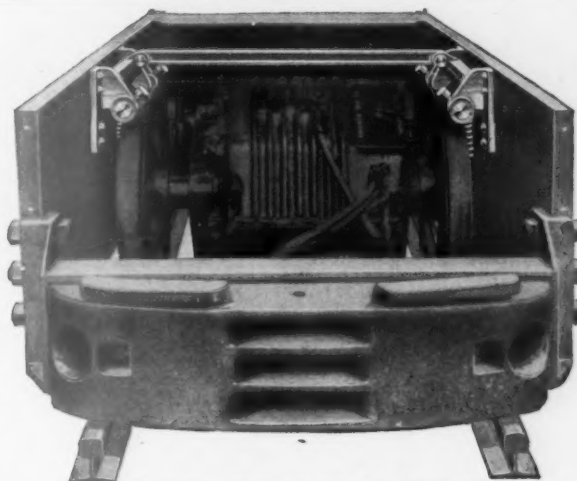
*Mine Safety*  *Appliances Co.*

*Braddock Ave. & Thomas Blvd. Pittsburgh, Pa.*



# Equalized —

**For  
Perfect  
Track  
Performance**



Transverse Equalizer Over the Front Axle

You've heard of Mine Locomotives that "ride like Pullmans."

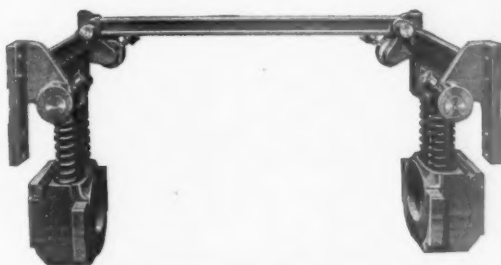
Well, they're Goodman Locomotives, equipped with the Goodman patent Transverse Equalizer—the most recent of really big developments in locomotive design and construction.

The Transverse Equalizer is a balancer—affording a wide range of wheel freedom for safe and fast operation over the roughest of mine tracks, without imposing undue stresses on the axle-box springs, or trying to twist the frame out of shape.

It keeps the locomotive on the track in places where otherwise there would surely be derailments.

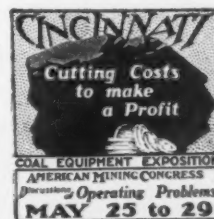
It increases pulling power, softens the shocks of high-duty operation, reduces wear and tear on the locomotive and the tracks, and minimizes spring breakages. It is simple in construction, and requires no maintenance attention.

This exclusively Goodman feature is not a "talking point" nor a "selling point"—it is a "working point" of highest operative value.



The Transverse Equalizer is extremely simple. Here it is, with axle boxes and springs.

Fully described in our Haulage Locomotive Catalog, Book No. 230.



(92)

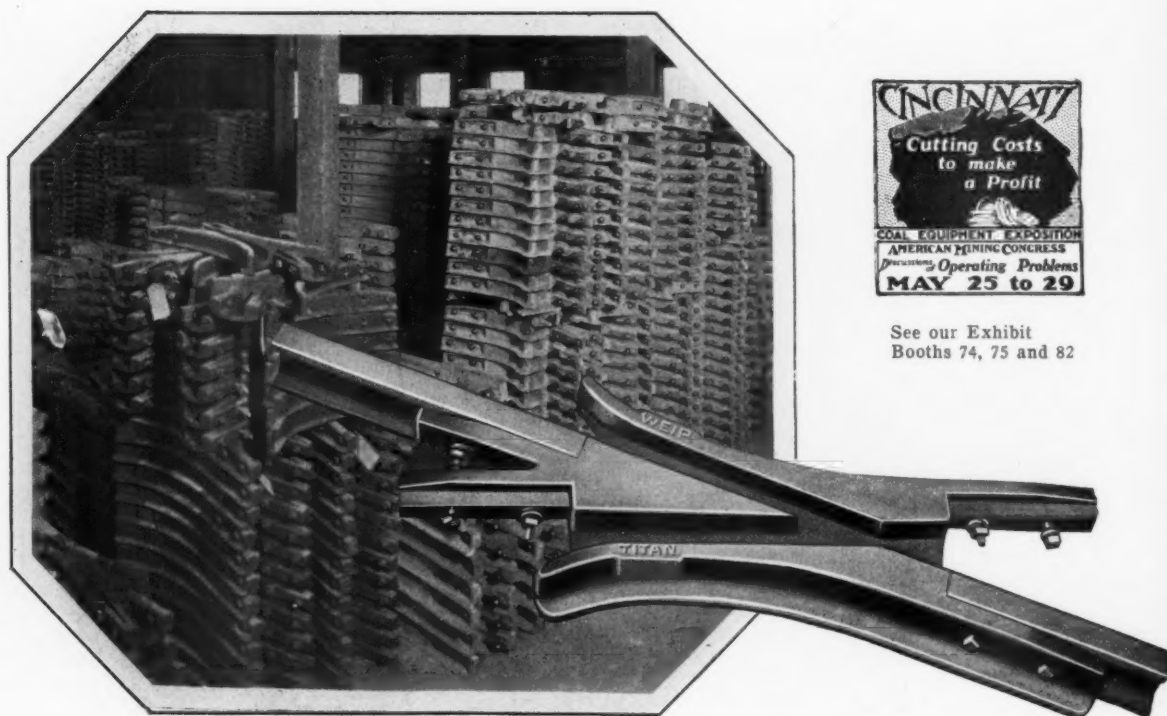
**GOODMAN MANUFACTURING COMPANY**  
 PITTSBURGH 4746 to 4854 South Halsted Street CHICAGO, ILL.  
 CHARLESTON, W.VA. CINCINNATI  
 ST. LOUIS DENVER HUNTINGTON, W.VA.  
 BIRMINGHAM

# Long Life Track Work — Lower Production Costs

Weir Titan Frog turnouts are outwearing all other types, in hundreds of progressive operations over the country. Weir Track Work will do the same for you.

When you buy Weir Track Work you buy

Longer Life  
Bigger Value  
Quickest Shipment  
Guaranteed Quality  
Best Service to Customer



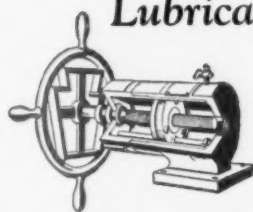
See our Exhibit  
Booths 74, 75 and 82

## WEIR FROG COMPANY

CINCINNATI, OHIO



*Lubricated in ten minutes, instead of two hours*



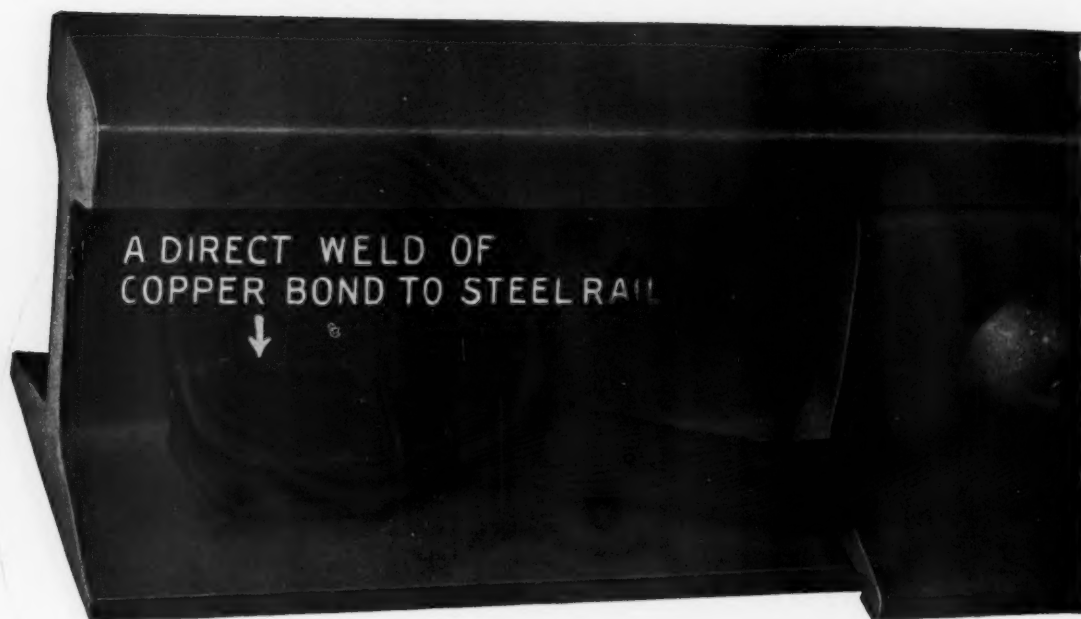
*Sectional view of Keystone Safety Lubricator, which is the main grease reservoir and agency of compression.*

**N**OW in ten minutes, instead of two hours, by just turning the wheel of the Keystone Safety Lubricator the twenty-three bearings of this Bailey Shaker Screen are lubricated. Equipped with the Keystone System, "metal arms" reach out from the lubricator to every bearing on the screen. Through these feed-pipes Keystone Grease is forced, under high pressure, directly to the bearings without waste. No other lubricating system frees laborers from individual attention to each and every bearing. No system other than Keystone's has centralized control, making possible the *safe* lubrication of many bearings from one convenient spot, often without costly production interruptions. It is an exclusive Keystone feature. *Write for free literature. Investigate! KEYSTONE LUBRICATING CO., 21st and Clearfield Streets, Philadelphia, Pa. Est. 1884. Branches and Warehouses located in leading cities of the world.*

## KEYSTONE SAFETY SYSTEM of KEYSTONE GREASE LUBRICATION



*Cross sectional view of Keystone Pressure Reduction Valve*



## A Continuous Path of Copper from Rail to Rail

High conductivity is one of the chief reasons for the selection of copper as the material from which Rail Bonds are made.

UNA Rail Bonds are not only made of *copper*, but they are welded to the rail with *copper* forming a continuous path of *copper* from rail to rail.

As copper only carries the current, the full carrying capacity of UNA Bonds is always realized.

Reduce your haulage costs with UNA Rail Bonds

UNA WELDING AND BONDING COMPANY, Cleveland, Ohio

WELDING  
MACHINES

**UNA**  
RAIL BONDS

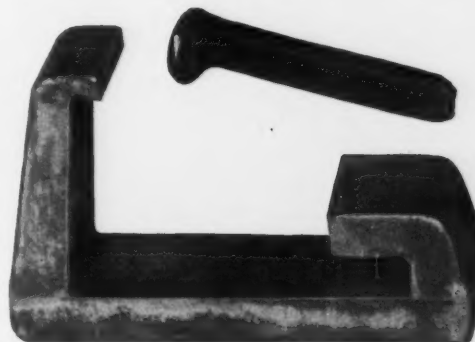
WELDING  
SUPPLIES

See UNA Bonding, at Booth No. 72—Cincinnati Convention



# The "HANDY" Rail Clamp

*As easy to use  
as they are simple  
in design*



THE "HANDY" RAIL CLAMP is all that its name implies—handy. It is a Track Extension Clamp. Simple, easy to apply, no parts to get lost. Just lay the extension rail in position, slip the clamp under the track rail and extension rail, wedge with an ordinary track spike, and the extension track is ready for service. The "Handy" Rail Clamp has been tried out in a number of mines and found entirely satisfactory.



See the "Handy" Rail Clamp at our Exhibit Booth No. 77 at the Cincinnati Exposition.

Our Catalog No. 3 describes the line of track material we carry, including turnouts, switches and switch stands, frogs, crossings, portable track, steel ties, and valuable diagrams of turnouts.

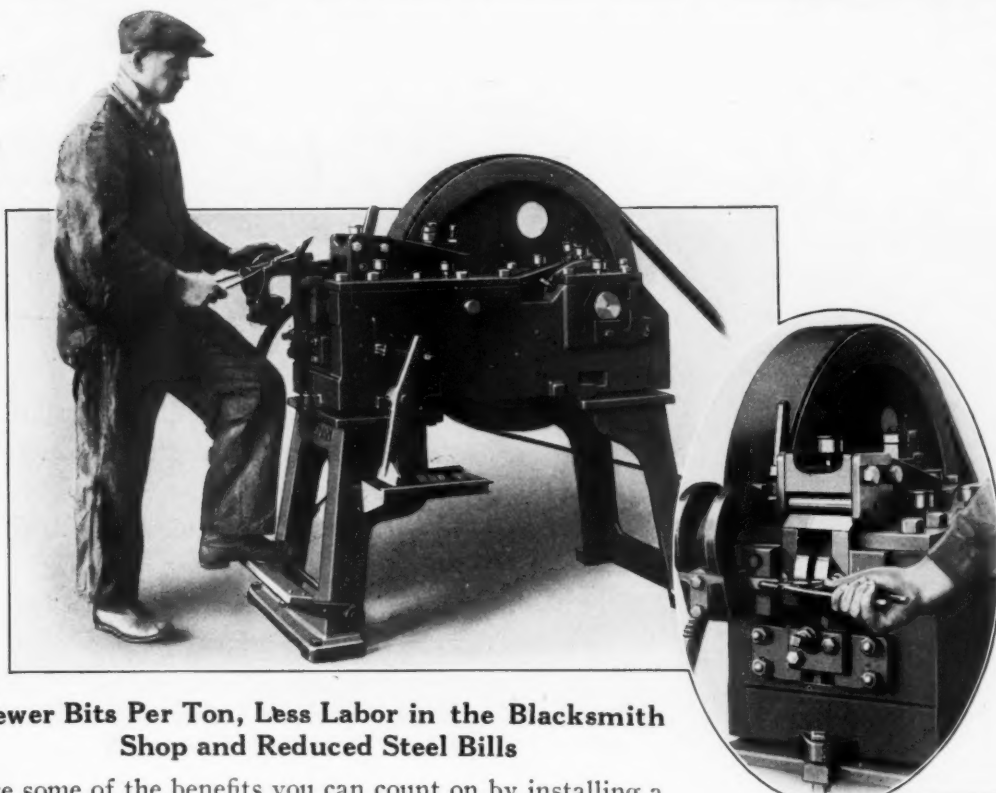
One Mine Superintendent writes: "The 'Handy' Clamp has been thoroughly demonstrated in our Tamroy Mine and has proven satisfactory in every respect." Another writes: "Have tried out the 'Handy' Rail Clamp and found it to be O. K." Another: "The 'Handy' Rail Clamp has been in our mine on test trial, and has proven very satisfactory in the operation of our Arcwall Machine." A General Manager says: "The 'Handy' Clamp was demonstrated at our Mine No. 3. In proof of our faith and reliance in the clamp, have placed our order for sufficient clamps to equip our entire Mine No. 3."

For information about this or any other track equipment address

**CENTRAL FROG & SWITCH CO.**  
CINCINNATI, OHIO

**CENTRAL**  
MINE TRACK EQUIPMENT

# Helping King Coal cut the cost per-ton!



## Fewer Bits Per Ton, Less Labor in the Blacksmith Shop and Reduced Steel Bills

are some of the benefits you can count on by installing a

### SULLIVAN Roller Bit Sharpener

This sharpener makes new bits and resharpens old ones by precision methods, with proper shape, correct angles on the cutting edge, the necessary clearance, and with absolute uniformity.

In addition to the above economies, The Sullivan Rolling Cutter Bit Sharpener is making these savings for its owners:

- 1—Saving in power consumed by mining machines in cutting coal.
- 2—A saving in mining machine upkeep, since dragging cutter bits and the severe strains caused by them are eliminated.
- 3—Saving of expensive delays at the face, since resetting is required less often with Sullivan roller sharpened bits.

Ask for new catalog No. 3772-M

Look for the Roller Bit Sharpener in Booth 20 at the Cincinnati Show



A new feature now obtainable with Sullivan Bit Sharpeners is shown in these pictures. This is the swage, for thinning the points of bit blanks. This prevents "fins" on new bits.

This is one of several new features which enable you to make better bits than ever on Sullivan Sharpeners.

#### DOMESTIC SALES OFFICES

Birmingham, Boston,  
Butte, Claremont,  
N. H., Cleveland, Dal-  
las, Denver, Duluth,  
El Paso, Huntington,  
W. Va., Joplin, Jun-  
eau, Knoxville, New  
York, Pittsburgh,  
St. Louis, Salt Lake,  
San Francisco  
Spokane.

COMPRESSORS AIR LIFT DIAMOND DRILLS SHARPENERS FORGES  
PORTABLE HOISTS COAL CUTTERS ROCK DRILLS DRILLING CONTRACTORS

**SULLIVAN**  
TRADE MARK  
**MACHINERY COMPANY**  
148 So. Michigan Ave. Chicago.

#### FOREIGN SALES OFFICES

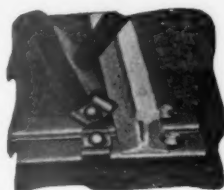
Algiers, Brussels,  
Calcutta, Christiania,  
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na, Lima, London,  
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Paris, San Juan, San-  
tiago, Shanghai, Syd-  
ney, N. S. W., Tokyo,  
Toronto, Tunis,  
Turin, Vancouver

# Bethlehem Mine Ties and Other Mine Track Specialties



## Bethlehem Steel Mine Ties

**B**ETHLEHEM Mine Ties are quickly and easily installed. The flange of the rail is inserted in the groove of the stationary hook-head button locating the track to exact gage. Then a blow from a hammer or other handy tool will turn the rotating locking clip, locking the rail to the tie. The arrangement of fastenings provide for inserting and removing a tie without taking the track apart.



All fastenings are integral with the tie and there are no loose parts to become lost or mislaid. No special tools are required to turn the locking clip—any large tool near at hand can be used.

Bethlehem Mine Ties are light in weight, yet very strong, and can be used over and over again—they will last indefinitely.

Bethlehem Steel Ties give 2½ inches added head-room as compared to wood ties, which is a distinct advantage in low seams.

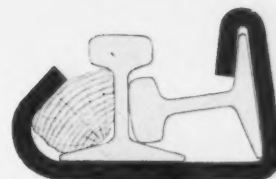
Light weight, quick and easy installation make Bethlehem Ties popular with miners.



Reinforced Weldless Coupling Link has great strength and will not buckle. The tapered sides of holes permit quick and easy coupling.



Bethlehem Coupling Pins are forged and specially heat treated to prevent breakage



Grimm Rail Clamp provides a quick and handy means of "Balling" or extending track in rooms and entry work



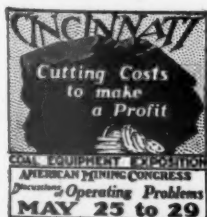
Parallel Throw Switch Stand, Model 1217, is extra low in height, strong and simple in design. Model 1217 is used for rails from 20 lbs. to 60 lbs. per yard



Solid Manganese Frog, Design 289, is of one-piece construction, and is flange bearing. This frog will outwear several ordinary frogs



Bethlehem Mine Car Sprags are made from a heavy steel bar (hollow), and will not break. The large hand guard prevents the sprag being inserted too far into the wheel, thus preventing injury to the user



Visit BETHLEHEM'S DISPLAY AT THE COAL EQUIPMENT EXPOSITION. Spaces 119 and 120

BETHLEHEM STEEL COMPANY, General Offices: BETHLEHEM, PA.

Sales Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Chicago Buffalo Pittsburgh  
Cleveland Cincinnati Detroit St. Louis San Francisco

BETHLEHEM STEEL EXPORT CORPORATION, LTD., 25 BROADWAY, NEW YORK CITY

Sole Exporter of Our Commercial Products

# BETHLEHEM

# Nuttall



**This  
Is Why  
We Can  
Heat Treat →  
Anything  
to 108" in  
Outside  
Diameter**



**O**UR heat-treating equipment includes nine oil and gas fired furnaces, all governed by central pyrometer system which gives complete control and regulation; one gas and one electric furnace for special work; water, chemical, brine and oil quenching tanks; complete case hardening equipment; traveling cranes; annealing furnaces; sand blast equipment; and Shore scleroscope and Brinell hardness testing equipment. For this reason we say that no one should be able to make better gears than Nuttall's. Be sure to visit our Exhibit at the Cincinnati Convention, Space 84.

**R.D. NUTTALL COMPANY**  
PITTSBURGH  PENNSYLVANIA

Philadelphia Office  
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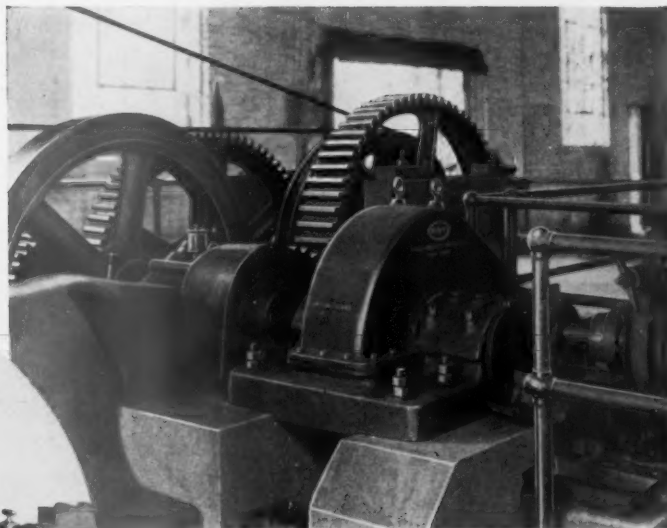
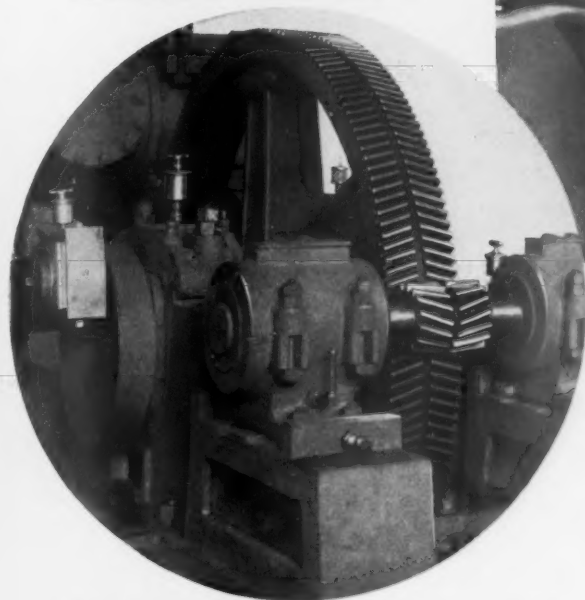
Canadian Agent:  
LYMAN TUBE & SUPPLY COMPANY  
Toronto—Montreal



# For All Important Gear Drives

*Specify*

# MAAG GEARS



Above—150 H. P. Maag Reduction Unit applied to Coal Mine Rope Haul. This is a typical Maag installation where freedom from breakdown assures against loss. In circle—Maag Herringbone Drive on Goyne Pump in excellent condition after three years of mine duty.

**Y**OU need Maag Gears in your mine and mill equipment to reduce the shut-down losses and costly delays that defective gearing causes.

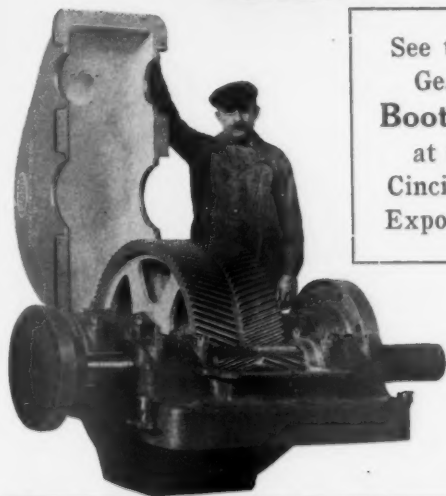
Maag Gears are different from ordinary gears. Every Maag Gear—spur, herringbone, spiral or helical—is generated with a tooth form that is a perfect unmodified involute.

As a result, the Maag Gear Tooth is widest at the base—this ensures strength. The true involute tooth form ensures the greatest proportion of rolling contact—this means less wear. The Maag Tooth uses practically the whole tooth profile in working contact—this means even wear. And finally, Maag Gears are cut with an accuracy impossible in other gears—this gives prolonged quietness in operation.

Maag Gears are made in sizes from 2 inches up to 40 feet in diameter.

Maag Gear Reduction Units are built to secure any ratio at any power and velocity ordinarily used. We recommend Maag *Ground Spur* Reduction Units where economy of space or specially long life is desired. This type of gear will positively outlast many sets of soft-cut gears of any type, and will render more satisfactory service at all times.

Our catalogue No. 265 tells the story of these remarkable gears—send for your copy



See these  
Gears  
**Booth 32**  
at the  
Cincinnati  
Exposition

# NILES-BEMENT-POND

GENERAL OFFICES: 111 BROADWAY, NEW YORK. Sales Offices in Boston, Rochester, Philadelphia, Birmingham, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, San Francisco, Los Angeles

# NOLAN



## AUTOMATIC CAGING SYSTEMS

YOU

are interested in  
cutting costs at to hand-lever →  
your mine, shaft, drift or slope.

The NOLAN'S will make a remarkable showing for you along this line.

Here are three designs which will be shown in full size at Cincinnati.

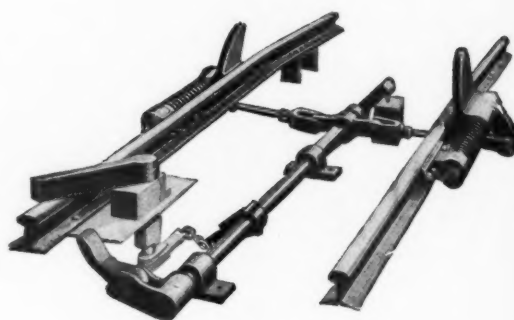
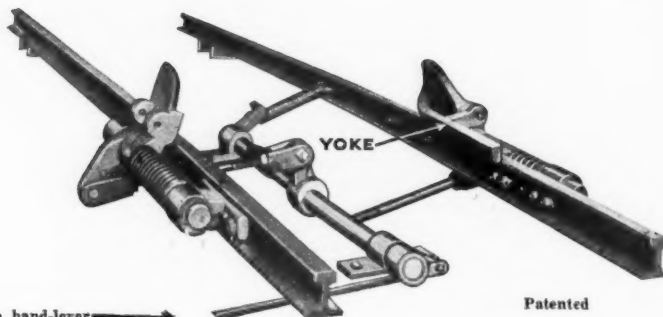
Look them over at Booth No. 44.

Notice their strength and simplicity and make inquiries of our customers as to the labor saved and the increased tonnage.

Our representatives will be glad to show you the many other designs, some of which will suit your mine.

**THE MINING SAFETY DEVICE CO.**

**BOWERSTON, OHIO**



# Interest in the Rheo-Washer is World-Wide

## The Rheo-Washer—

### What it is and does

- 1—A coal cleaning system that takes advantage of
  - (a) Specific gravity;
  - (b) Roughness of surface;
  - (c) Shape of the various pieces of coal.
- 2—The coal is washed down a long trough of variable grade with openings or traps at intervals into which the slate falls, being opposed in some cases by a rising stream of water, which prevents the coal being carried along with the slate.
- 3—A system of rewashing the middlings with the feed so that they aid in separating the clean coal from the slate, thus avoiding waste.
- 4—Simple construction—nothing to get out of order. Makes a separation of any desired degree with minimum waste.
- 5—Installation cost low. Labor costs reduced to a minimum. Its light weight, compactness and freedom from reciprocating parts removes the need for heavy, costly building construction.
- 6—Design permits of handling overloads and variations of feed.
- 7—Will wash all coal up to 4 inches—both anthracite and bituminous—with but one screening.
- 8—Not an experiment—a tried and proved system. Arrangements can be made to build it for your requirements entirely in the United States.

THE total annual tonnage capacity of Rheo-Washer installations throughout the world has increased as follows during the past five years:

1919—6,000,000 tons

1920—8,000,000 tons

1921—12,000,000 tons

1922—18,000,000 tons

1923—30,000,000 tons

1924—40,000,000 tons

The Rheo-Washer is used in 150 mines throughout Europe. And now it is being introduced to American Coal Operators, so that they, too, can obtain clean coal at lower cost.

*A. France-Focquet*

17 Quai St. Léonard  
Liège, Belgium

MR. AMAND ANDRY,  
7th Floor, 475 Tenth Ave., New York, N. Y.  
Kindly send us particulars on the Rheo-Washer.

Name.....

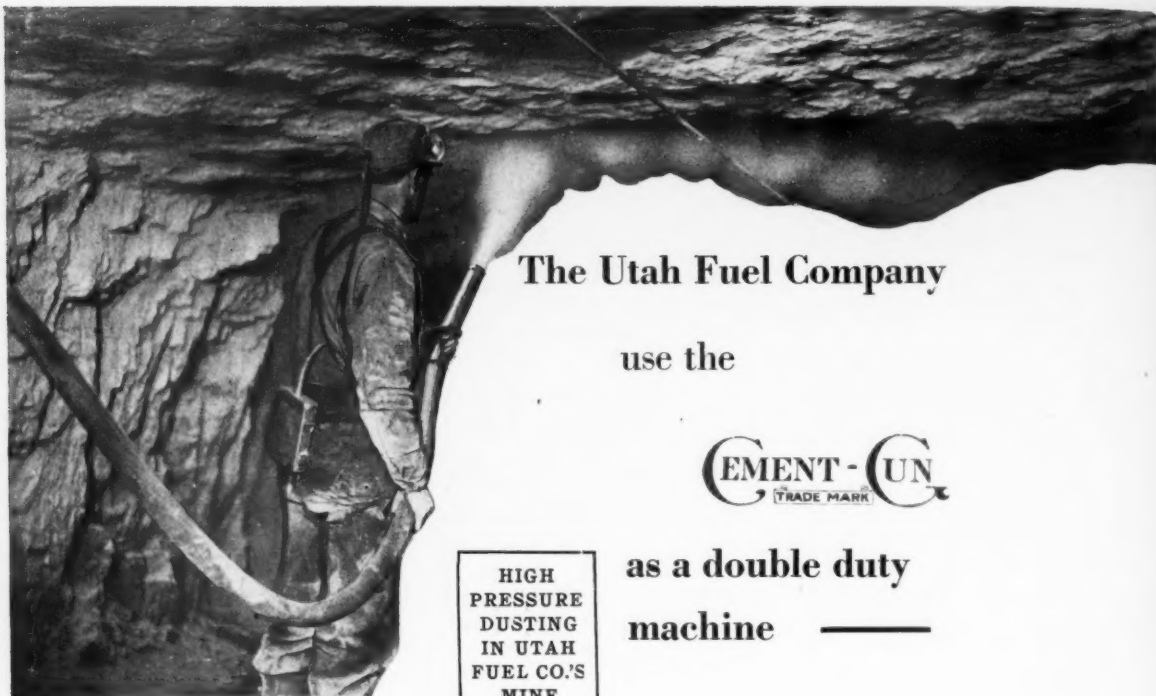
Company.....

Position.....

Address.....

# "CUTTING COSTS"

*at the Utah Fuel Company*



The Utah Fuel Company

use the

**CEMENT-GUN**  
TRADE MARK

as a double duty  
machine —

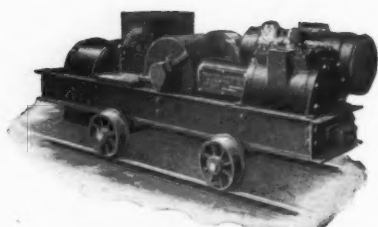
HIGH  
PRESSURE  
DUSTING  
IN UTAH  
FUEL CO.'S  
MINE

*For Rock Dusting*—under high pressure—less labor, less dust and more coal dust dislodged.

*For "Guniting"*—as a substitute for timber-building brattices, overcasts, etc.—

**—THAT'S CUTTING COSTS!!**

*Visit our booth at the American Mining Congress show at Cincinnati and let us show you how the "CEMENT-GUN" and the TRAYLOR COMPRESSOR will help you cut costs*



No "Cement-Gun" is properly complete without a TRAYLOR Compressor  
The Compressor that furnishes plenty of air

## Cement-Gun Company

Incorporated  
Allentown, Pa.

New York   Pittsburgh   Phoenix   Chicago  
Seattle   Salt Lake City

*Agents in Eastern Canada:*  
General Supply Co. of Canada, 356 Sparks St.,  
Ottawa

*Foreign Agency:*  
International Cement-Gun Co., Zeist, Holland

**THE CEMENT-GUN**  
IS NOT A RESTRICTED  
ARTICLE AND MAY BE  
PURCHASED AND USED  
BY ANY ONE

In order, however, to insure to all users of "Gunite" that they will obtain prompt and proper bids we have established a Contract Dept., and upon application we will be pleased to have them prepare estimates on your work.



## *The LEGRABON Mine Dusting Machine*



For Rapid, Efficient,  
and Thorough Rock  
Dusting

Developed, Perfected and  
Adopted for Rock  
Dusting by the  
Pittsburgh Coal Co.



The Legrabon Mine Dusting Machine distributes 125 pounds of rock dust per minute. This capacity permits a rate of travel 40 to 45 feet per minute and keeps the machine and its operator in advance of the dust cloud. Discharging around the entire perimeter of its semi-circular nozzle it makes a perfect dust barrage—no part of the mine surfaces can be slighted. The high velocity of discharge drives the dust into every hole and crevice and uniformly coats every inch of exposed surface. The practicability of the Legrabon Mine Dusting Machine has been proven by several months of actual service in the mines of the Pittsburgh Coal Company.

*See this machine at the Cincinnati Exposition—Space 112*

**DIAMOND MACHINE COMPANY**  
MONONGAHELA, PENNA.

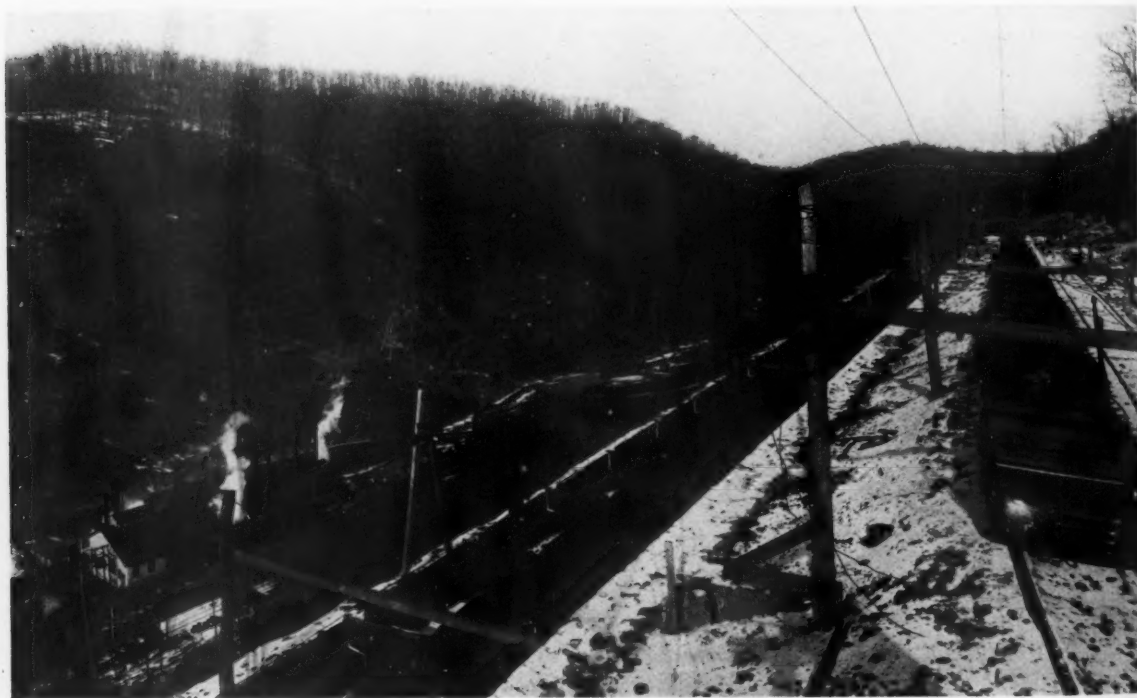
Selling Agents: Cooke-Wilson Electric Supply Company  
PITTSBURGH, PA.      ATHENS, OHIO      CHARLESTON, W. VA.



AT THE IROQUOIS COAL CO., W. VA.



AT THE GULF SMOKELESS COAL CO.



KOPPEL CARS AT THE ELK RIVER COAL &amp; LUMBER CO.

## GOOD CARS ARE ALWAYS THE CHEAPEST!

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See us at Cincinnati—we have spaces 93 and 94—let us show you why Koppel Cars are better.

We are headquarters for Cars, Rails, Track, Ties, Frogs, Switches, Turntables, etc.



## Koppel Industrial Car & Equipment Co.

OWNED BY THE  
PRESSED STEEL CAR CO.

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Peoples Gas Bldg.  
SAN FRANCISCO  
Rialto Bldg.



**We wish** - every coal mining man could visit our wonderful car factory and see how thoroughly equipped our factory is to turn out your mine cars. There is always a standing invitation to visit us.

**We can't move our factory** - but, we are going to move ourselves to Cincinnati and attend the National Exposition of Coal Mining Equipment and Machinery. May 25th, 26th, 27th, 28th and 29th are the dates.

**Booth 40** - We will show this year an entirely new and unusual type of mine car. Be sure and come around. We want you to see this car and we want to see you—shake a hand and say “hello.”

# THE WATT MINING CAR WHEEL CO.

BARNESVILLE, OHIO

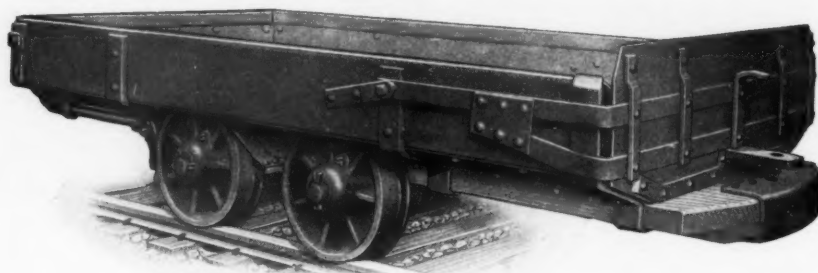
*Selling “Watt Quality Products”*

PITTSBURGH, PA.—W. C. Wilson, 1135 Greenfield Ave.  
NEW YORK, N. Y.—C. R. Gier Co., 66 Beaver St.  
SAN FRANCISCO, CALIF.—N. D. Phelps, Sheldon Bldg.

BIRMINGHAM, ALA.—Industrial Supply Co.

HUNTINGTON, W. VA.—J. E. Graham, 341 Sixth Ave.  
CHICAGO, ILL.—W. W. Baker, 140 South Dearborn St.  
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# A New Type Hockensmith Car



Which can  
be used with  
your present  
equipment

Rotary or End  
Dump

Increased Capacity  
or  
Decreased Height

Eliminates  
Roof and Bottom  
Work

This design will be exhibited in spaces 34 and 51 at the National Exposition of Coal Mining Equipment and Machinery of the American Mining Congress, to be held at Cincinnati, Ohio, May 25 to 29.

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MINERS AND SHIPPERS

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YOUNGSTOWN  
WEST VIRGINIA  
JEROME DIST. HANCOCK SHIPMENT  
AND STEAM AND BY PRODUCT

COKE  
STANDARD CONNELLSVILLE  
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FIRST NATIONAL BANK BUILDING

PITTSBURGH, PENNA. April 6, 1925.

W. L. APPELDER,  
ASSISTANT TO THE PRESIDENT

Hockensmith Wheel & Mine Car Co.,  
Attention W. D. Hockensmith,  
President and General Manager,  
Penn., Pennsylvania.

Gentlemen:

I beg to advise you that we have been using the 100 composite wagons which you built for our Orient Mine last summer for a sufficient length of time to satisfy ourselves that we used good judgment in purchasing this particular type of wagon.

Without any reduction in carrying capacity, and without any change in either length or width, these wagons are of equal capacity to our old wagons, in spite of the fact that they are about 9" lower. This fact makes the wagons much easier to load and to handle.

On account of the satisfaction which we have been obtaining from these wagons, we recently placed an initial order with you for one of our other mines for 100 composite cars. At this latter plant the height of the wagon will be reduced 4", without affecting either the length, width or capacity of the car. Inasmuch as this is a mine in which the taking down of roof is necessary for wagon clearance, this item of 4" is a very important one.

Very truly yours,

WLA:K

Assistant to the President.

# HOCKENSMITH WHEEL & MINE CAR CO.

PENN, PENNSYLVANIA (Pittsburgh District)

Long Distance Phone:—Jeannette 700

Huntington, W. Va.—Huntington Supply & Equipment Company

Clarksburg, W. Va.—Mr. Norman Strugnell.

Chicago, Ill.—B. E. Schonthal & Company



*May 25th to 29th—at the*

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even the  
Timken Bearing  
Exhibit  
will present  
nothing  
more convincing  
than the fact  
that 93  
repeat orders for

## TIMKEN-EQUIPPED MINE CARS

were received  
from 44  
operators  
in 18 states  
—some of  
the orders  
for as many  
as 600 cars!

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*Booths 3 and 4, Cincinnati Exposition*

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*Presents*

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*"The Pump the Mine Man Needs"*

AUSTIN PUMPS are visible evidence of a manufacturer forgetting price competition while creating a product that will give the best possible service. In fact—living up to an ideal.

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The wonder of all who see it  
Solves your Pumping Problems

### DeLaval Centrifugal Pumps

The choice of largest operators for: Long Life, Ease of Repair, Interchangeability, Maintained Capacity and Efficiency—made in Dravo Anti-Acid Metal For Bad Water

### DeLaval Worm Gear Speed Reducers

Best Drive for Conveyors, Picking Tables, Fan Drives.  
Equipped with Dravo, Plastic Bronze Bearings

## DRAVO BRONZE AND MANUFACTURING COMPANY

Anti-Acid Bronze Solves Bad Water Conditions in your mines. Plastic Bronze Motor Bearings for any size or type of motor. Multiport Check Valves. Foot Valves and Strainers

## DRAVO CONTRACTING COMPANY

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# THIS IS THE WEINMAN SELF-OILER TYPE MINE GATHERING PUMP

BUILT IN A DESIGN WHICH WAS ORIGINATED AND PERFECTED  
IN OUR FACTORY TO MEET ACTUAL MINING REQUIREMENTS

## *Single Cylinder—Double Acting*

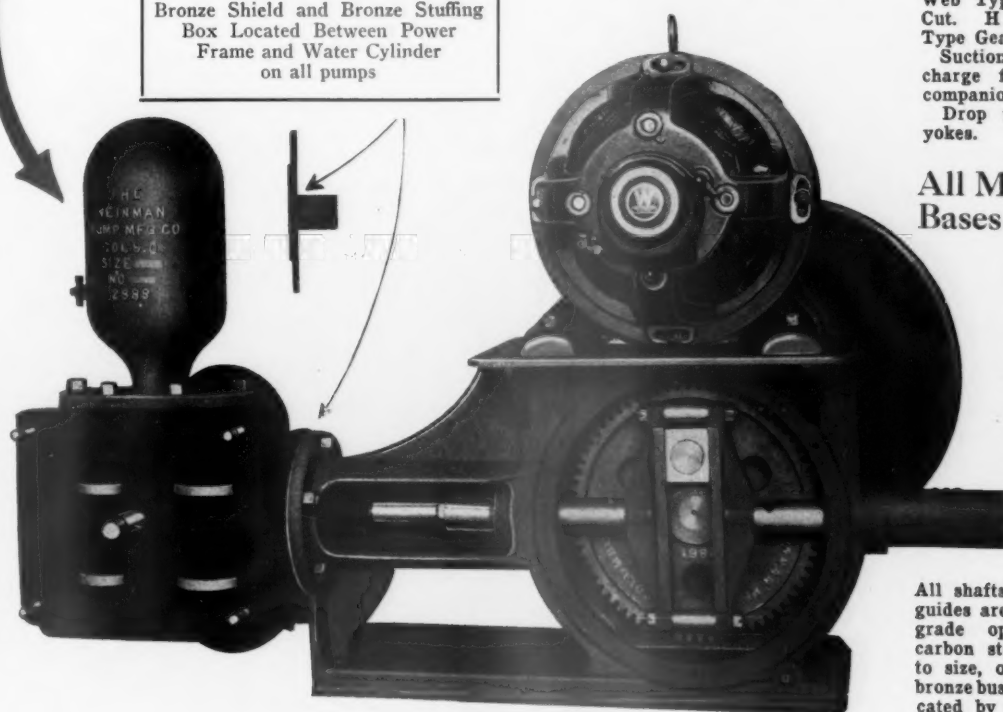
The standard pump for sweet water is of cast iron construction with bronze fittings, but for use in localities having acid-water all parts coming into direct contact with the water being pumped are made of

### "WEINMAN" ANTI-ACID BRONZE

a special alloy of virgin metals produced in our own foundry

(ANTI-ACID PARTS SHOWN IN COLOR ON CUT APPEARING BELOW)

Bronze Shield and Bronze Stuffing  
Box Located Between Power  
Frame and Water Cylinder  
on all pumps



All Gears Solid  
Web Type, Machine  
Cut. Heavy Box  
Type Gear Guards.  
Suction and Dis-  
charge fitted with  
companion flanges.  
Drop forged steel  
yokes.

### All Motor Bases Planed

No Grease  
Cups

No Babbitt  
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No Bearing  
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All Bearings  
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Bronze

All shafts, pins, and  
guides are of highest  
grade open hearth  
carbon steel, ground  
to size, operating in  
bronze bushings, lubri-  
cated by splash sys-  
tem from main gear  
housing.

Figure 508

Be sure to get the Genuine-Original "Weinman" Anti-Acid Bronze Metal—made in  
our own foundry under our own special formula and process

Write for our Special Thirty-Day Free Trial Offer

## The Weinman Pump Manufacturing Co.

(ESTABLISHED 1850)

COLUMBUS, OHIO, U. S. A.

(EXHIBIT SPACE 7—CINCINNATI EXPOSITION)

---

## A Balanced Mining Journal

The Mining Congress Journal presents once a month in concise readable form, from all the wealth of economic and technical news available, a resume of just what the busy mining man wants to know.

It covers and interprets the government's attitude toward, and rulings pertinent to mining, tax, tariff, immigration, legislation, departmental news and decisions; other national economic questions such as labor and industrial cooperation and transportation; a digest of expressed opinion and news pertaining to mining; the latest developments in practical operating problems, particularly those bearing on the powerful standardization movement; safety work; news of the developments among the manufacturers; authoritative half yearly reviews of activities in all mining fields. The important movements sponsored by the American Mining Congress are ably reinforced and discussed in its columns. In pertinent articles by leading mining men—in editorials—in news, in technical articles—it is characterized by dependability, breadth of observation and ability to make deductions and precise interpretations.

**At Cincinnati Visit the Booth of**





# POST-GLOVER

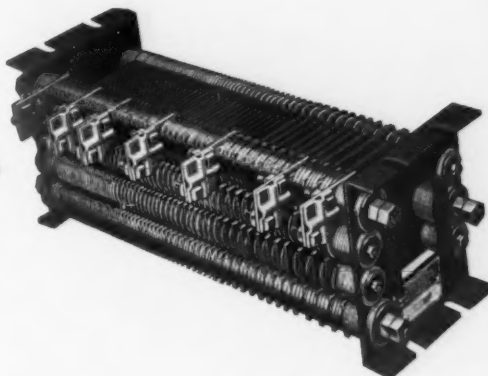
## Mining Specialties

### *Improved Steel Grids*

Increased Resistance----

Greater Carrying Capacity---

Requires Less Space---



All these improvements have been the result of two and one-half years of development work both in the laboratory shop and in the field.

*Also manufacturers of W-W Self-starters, Post-Glover Panel-boards and Switchboards and Johns-Manville  
Ebony and Transite Products*

**THE POST-GLOVER ELECTRIC CO.**

*Cincinnati, Ohio*

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Booth

**57**

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The SURE GRIP  
TROLLEY CLAMP



The BLACK DIAMOND  
MINE HANGER



A trolley line supported by SURE GRIP Clamps and insulated by BLACK DIAMOND Hangers insures an unfailing current supply for the haulage system with consequent decrease in cost of coal production.

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*Manufacturer of a complete line of overhead trolley material illustrated and described in Catalog No. 22—sent on request*

CINCINNATI, OHIO

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1925

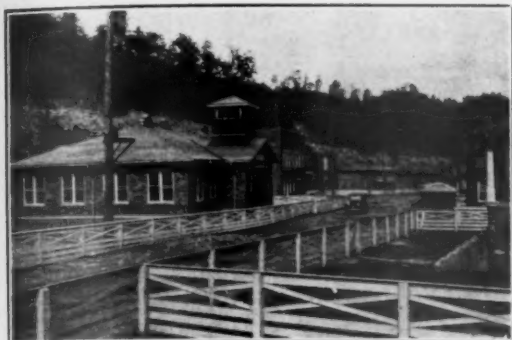
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2  
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A VIRGINIA VILLAGE



## *Building Contractors*

Industrial Developments including Town Layouts, Public Buildings, Community Buildings, Sewage Disposal and Housing, Coal Mining Plants, Power Houses and Shops.

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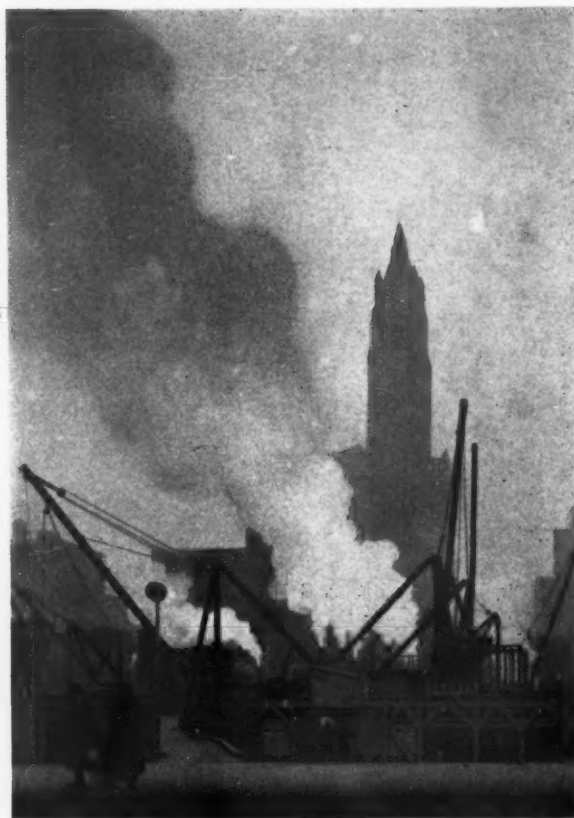
**BUILDERS OF COMPLETE MINING PLANTS AND INDUSTRIAL TOWNS  
SINCE 1896**

*Our past performance is your guarantee*



A PENNSYLVANIA VILLAGE

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TICKING ON THE SKY LINE of profitable production means continuous struggle. Things are moving fast. New industrial structures are pushing up about you that are using the latest methods and cost reducing equipment. The best way to meet their competition is to keep fully abreast of modern major developments with a weather eye on the details. Pointing the way for all who will make use of them, the practical services of the American Mining Congress range from fighting the industry's biggest battles at the seat of government to material assistance in working out the small and intricate problems that baffle local solution.

Many companies owe their prosperity or existence to the efforts of one or more departments of the American Mining Congress—such as the Tariff or Tax Divisions. Many are saving huge sums by applying the Approved Standard Mining Practices. Others are establishing harmonious relations with their communities of workers under the encouragement of the Industrial Cooperation Division. These are a few of the major services sponsored by the American Mining Congress. This service should be taken full advantage of by every mining man.

**The AMERICAN MINING CONGRESS**

841 MUNSEY BUILDING

WASHINGTON, D. C.



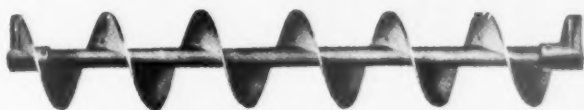
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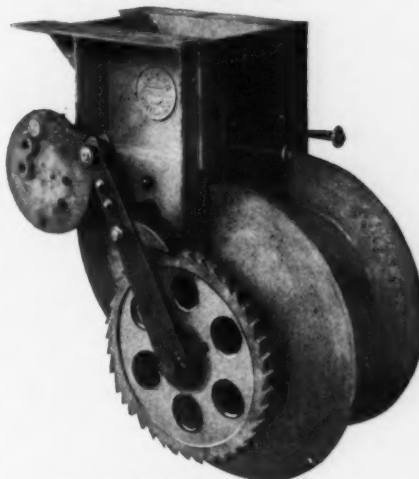


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Cold Rolled Steel, Sectional Flights, Wear Long

We Also Make

Spiral and Ribbon Conveyors of Monel Metal



**ROTARY FEEDERS**

Large Capacity Adapted for Material Over  
6 inches in Diameter

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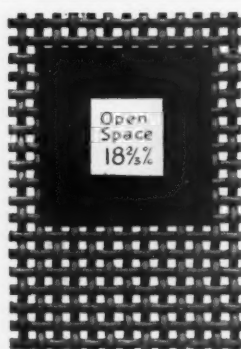
# American Wire Rope

## AERIAL WIRE ROPE TRAMWAYS

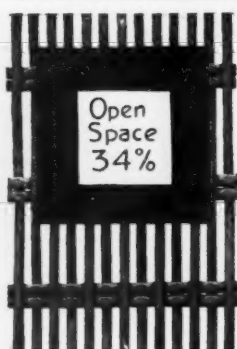
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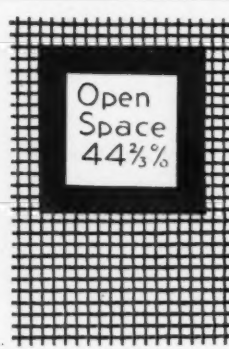
Chicago-New York



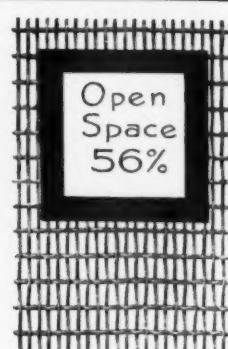
\*Opening .048"



\*Opening .048"



\*Opening .048"



\*Opening .048"

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properly selected and applied to your equipments will save you Power, Time, Attendance and Replacement Costs, improve your product and increase your output.

With properly chosen Screens, your equipment will handle more feed, give better results, and show a higher average of efficiency in every subsequent process.

\*Every "Screen Opening" may be had in various weaves. For long life, select a rugged wire; for large tonnage PER HOUR, select a screen with maximum open, active screening space.

Send for the handy Pocket Wire Cloth List. The comprehensive tables, as illustrated, list a Thousand "Perfect" Screens. They make it easy to choose the best screen for your needs, or check up on the screens you have.

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"Perfect" Double Crimped Square Mesh Screens											
Width of Opening		Commercial Designation		Diameter of Wire		Approximate Weight per 100 Sq. Ft.		Loss From per Square Foot			
Inches	Millicentimeters	Number of Wires per Inch	Number of Wires per Inch (1/2" to 1" Gauge)	Inches	Millicentimeters	Iron or Steel	Copper, Brass or Bronze	Iron or Steel	Copper, Brass or Bronze	Per cent	Application
.104	4.880	4 1/2	23	.028	711	33	223	.11	.45	2.25	
.104	4.880	3 1/2	13	.062	2.007	100					
.160	4.880	4 1/2	21	.038	.813	30	34	.13	.80		
.1875	4.763		13	.062	2.007	200	238	.45			
.1875	4.763		12	.105	2.667	250	298	.60			
.1875	4.763		11	.120	3.048	285	371	.65			
.1875	4.763		10	.135	3.429	350	445	.85			
.1875	4.763		9	.148	3.750	400	459	.75			
.1875	4.763		8	.162	4.113	510	581	.90			
.1875	4.763		7	.177	4.496	600	694	1.10			
.1875	4.763		6	.192	4.877	650	741	1.70			
.187	4.763	3 1/2	7	.177	4.496	500	675	1.30		8.00	
.187	4.763	3 1/2	11	.120	3.048	310	353	.58		3.65	
.187	4.763	4	19	.083	2.099	100	114	.27		1.25	
.187	4.763	4 1/2	20	.035	.800	25	40	.14		.80	
.185	4.699	3	9	.148	3.728	445	507	.75		5.00	
.181	4.597	3 1/2	12	.105	2.667	275	357	.55		3.00	
.181	4.597	4 1/2	19	.041	1.042	63		.17		.95	
.176	4.413	4	15	.072	1.829	135	154	.35		1.75	
.177	4.4	5	24	.023	.581	17		.10			
.175	4.443	3 1/2	13	.092	2.337	210	240	.49		2.50	
.175	4.443	4 1/2	18	.047	1.191	70	80	.32		.75	
.175	4.443	5	23	.025	.635	24		.11			
.172	4.367	3 1/2	10	.115	2.925	390	445	.69		4.50	
.172	4.367	5	23	.028	.711	28	30	.12		.45	
.171	4.300	(1 1/2" Spaced)									
.171	4.300	3	9	.193	4.913	550	627	1.10		6.50	
.170	4.300	4	14	.062	1.588	198		.45		2.25	
.168	4.267	4 1/2	17	.054	1.378	27	33	.25		1.05	
.168	4.267	5	21	.032	.813	33		.14		.85	
.160		3 1/2	11			330					
.130	3.209	4	11	.120	3.048	370	423	.75		4.50	
.130	3.209	4 1/2	15	.092	2.337	250	285	.60		3.55	
.128	3.012	5	15	.072	1.829	168	193	.50		2.40	
.128	3.012	5 1/2	17	.064	1.628	105	120	.35		1.40	
.12750	3.25										
.128	3.2	6	18	.041	1.042	85	74	.25		.85	
.125	3.175	(1 1/2" Spaced)									
.125	3.175	7	26	.019	.483	15		.10			
.123	3.151	7	35	.020	.508	20		.11			
.120	3.048	5	14	.080	2.032	212	242	.55		2.75	
.120	3.048	6	18	.047	1.191	88	100	.30		1.10	
.120	3.048	7	24	.023	.581	25	28	.12		.45	

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608 South Newstead Avenue



# The MINING CONGRESS JOURNAL

PUBLISHED EACH MONTH BY  
Subscription Rate: Per Year, \$3.00

THE AMERICAN MINING CONGRESS

MUNSEY BLDG., WASHINGTON, D. C.  
Single Copies: \$0.30

VOLUME 11

MAY, 1925

NUMBER 5

## "AT CINCINNATI IN 1925"

IN AN editorial in our May, 1924, issue the following statement was made:

"At the present time approximately one-third of the bituminous coal mines of the country are closed because they are not able to find a market which will cover the cost of production; another large part are working at a loss in the hope that some condition may arise which will enable them to earn a profit."

In spite of the elapse of a year that statement is as literally true now as then. The low cost mines have been securing the business. Coal operators with high costs have been facing the necessity of cutting cost of production or bankruptcy. The human tendency is to defeat failure, and the coal industry is intensely human, individually and collectively. It therefore last May tried an experiment which was so successful that it is being repeated again this May—the experiment of a congregation of thousands of the practical operating officials of the industry in an informal convention where there may be an exchange of ideas concerning cost reduction and the most economical and efficient methods of mining coal. Policy matters are deliberately barred from the convention. Only operating problems were and are to be discussed. Are you using mechanical loaders? Are you controlling your equipment automatically? Are you having difficulty in securing greater percentage of lump coal? Are you planning to rock dust your mine? All of these questions will be discussed at Cincinnati during the week of May 25—discussed by the men who are actually working out these problems. Last year more than 3,000 practical operating men were in attendance; this year the present indications are that even this number will be increased.

Coupled with the convention is the National Exposition of Mines Equipment. One hundred manufacturers of equipment will participate with the operators in giving graphic illustrations as to how they are doing their part in solving cost problems. Mechanical loaders will be in actual operation; automatic substations will demonstrate their economy of method; rock-dusting equipment will show its adaptability to explosion prevention, and every exhibit will have a constructive message to the operator who is looking for ways and means to operate his mine more efficiently and economically.

At every turn is heard the familiar statement, "The vital problem of the coal industry is cutting production costs." Cincinnati will help the industry make that phrase obsolete by not only telling you how to do it but by showing you how to do it.

Every mine superintendent, engineer, foreman—every man connected with the practical end of coal production—should make the week of May 25 pay him real

dividends. Let us all—the entire coal industry, from the president down to the foreman—get every benefit from "At Cincinnati in 1925."

## CONFISCATORY TAXES

"ALL natural resources of this state, as defined herein, are hereby declared to be the property of the State of Florida until there shall have been paid to the state, as hereinafter provided, the severance tax levied thereon by this Act. . . .

"Such taxes, with any penalty or costs which may be imposed as herein provided, shall operate as a first lien and privilege upon such natural resources and the situs thereof, which lien and privilege shall follow said natural resources into the hands of third persons, whether in good or bad faith, and whether the same be found in a manufactured or an unmanufactured state, until such taxes and any penalty imposed shall have been paid in full with all costs of collection."

The tax referred to in the foregoing amounts to two and one-half percent (2½%) of the gross cash market value of such natural resources at the time when and the place where severed. The paragraphs quoted appear in Sections 2 and 3 of a bill introduced in the Florida State Legislature. The tax, if adopted, is to be imposed as a supplemental tax in addition to all other taxes now provided for by law.

The measure represents an unconscionable disregard of property rights by whoever is sponsoring it. Its passage is unthinkable. And yet the tendency to disregard property rights and to discriminate against the natural resources industries, in matters of taxation, is spreading. In Minnesota this tendency predominates. And in that state already oppressive double taxation is discouraging prospecting and exploration work and is stifling the development of new mineral enterprises.

Unsuccessful attempts have been made recently in other mining states to put through tax measures similar in character and effect to the Minnesota "occupation tax" law. The statement has been made that in Connecticut more than 90 percent of the 1,666 bills introduced at this session of the legislature of that state were of a confiscatory nature. This tendency toward confiscation of property by taxation constitutes a menace to the mining industry, and this Florida measure illustrates how far the proponents of discriminatory tax measures are willing and anxious to go.

Efforts that are being made to stimulate the development of the South's vast mineral resources will receive a serious setback if such tax measures as this Florida bill gain favor among the electorates of the Southern States. People with money to invest will be reluctant to place it in natural resource enterprises in states where such enterprises are constantly threatened with confiscatory taxation and harassed by political demagogues.

### RESPONSIBILITY AND POWER

**T**HE old saying that money makes money is not altogether true. Money only makes money in the hands of the thrifty, the prudent, and the sagacious. Money is stored-up power. Its possession carries with it an element of responsibility, not only to preserve its face intact but to make it serve humanity. Its earning power depends upon its service. For many years the United States was a debtor nation. Other and older nations loaned their money to us, loaned their stored-up power to us, for the consideration of an agreed upon rate of interest, and we were able, by virtue of its use, to earn that interest rate, plus an additional amount, which in due time became a part of the aggregate wealth of the nation. We were the servants of those lending nations until we were enabled by these additional profits to accumulate that capital which was necessary to the conduct of our own industrial affairs. Notwithstanding the great accumulation of wealth in this country between the days of the Civil War and the outbreak of the World War, we were still at that time a debtor nation. These debts, which at one time represented as large a percentage of the value of our industrial machinery as it was then safe to loan, gradually dwindled in proportion, until at the outbreak of the World War our debt was an infinitesimal part of the value of our productive machinery. The earning power of that machinery was so great that our foreign debt was soon extinguished and in a few years' time we found ourselves a gigantic world creditor. Instead of being obliged to work for other nations, other nations by that same token are now obliged to work for us. During the debtor period loans were made to us not because of national responsibility but because it was profitable. These conditions now being reversed, we may loan to these foreign nations and their industrial enterprises our accumulated funds, not because of a responsibility to do so but because sagacious business judgment justifies that course. Some of our debtors may not be able to pay without assistance. To that debtor, with the labor and the raw material but without the machinery of fabrication, we may well furnish that machinery in order that he may be thus enabled to meet his obligation to us.

And regardless of the very necessary tariffs by which we must first protect our own industries, we will continue to furnish the buying power to aid the development of these foreign industries. Our tariffs are modest compared with those of any other country and furnish only a justified admission charge to this the richest market of the world.

We repeat a statement as true now as when made by Secretary Hoover three years ago at Atlantic City: "We may be able to maintain a favorable trade balance with foreign countries if we are willing to invest our surplus capital in reproductive enterprises abroad." This policy does not carry with it any suggestion of responsibility for the success of others. These loans are to be made only as sponsored by business sagacity and good judgment. That judgment will prevent the loan to those peoples who do not believe in the rights of property. They will not be made to countries lacking a stable government which can and will protect the rights of the creditors. Loans will not be made for the purpose of bringing about the establishment of a stable form of government, but the stable form of government will be accomplished with all of its many domestic benefits, in order that money which means available power may be secured for the maintenance and perpetuation of stable government. The greatest philanthropists of the world have conducted their philanthropic efforts through a business organization entirely separate from that through which the

accumulations were made. It is only by the success of business enterprises and in proportion to that success that we are able to lend substantial aid to others. Let us be just to the world and expect justice in return, rather than be charitable and need charity in return.

### THE SAVING IMPULSE

**T**HE coal people are in a position where they need something to jar them out of themselves and to put them into a position to think purposefully of a way out of their dilemma. They have the best of excuses for being in the position in which they find themselves. And, if they do not pull themselves out of the mud by their own bootstraps, they have the satisfaction of knowing that no one else has ever been able to do it.

These gentlemen lacked the same opportunity which confronted other business men, a few years ago, to build up cash reserves. Instead of piling up money, at that time, which would now come in handy, they were subjected to price and profit limitations. In addition, theirs was a conspicuous and a much advertised business. The excess profits tax was then a factor in our national life. And, the persistent agents of the Treasury Department saw to it that these gentlemen paid into the treasury every dollar that was due. Thus they started into the period of inevitable liquidation without much cash on hand. Their affairs had attracted considerable attention and the desire to regulate them was almost a disease in some political circles. The result was that they were forced into an economic experiment, namely, to pay higher wages than anybody else was paying and at the same time to liquidate, by bankruptcy, 30 percent of the whole number of bituminous mines. This was made the more easy because these gentlemen lacked any cash reserves which would tide them over a period of "hard times."

When the process of liquidation started, it extended much further than was originally intended. The bankrupting of the coal mines themselves did not stop with those which it was desired to eliminate; it spread over to touch many which it was desired to preserve. Nor were the consequences confined to coal. Those who formerly sold goods to the coal mines found themselves with bankrupts as customers and either able to do no business or to get no money for the business they did do. This, automatically, slowed down the other business and, with it, slowed down the demand for coal. That in turn slowed down the demand for railroad service which, in turn, decreased the demand for coal. Thus the sure consequence was that coal's financial distress reacted to decrease the demand for its product and thereby to increase its distress.

The coal people, finding themselves in that position, are traveling in the circle of their own gloomy thoughts. The further they go, the worse they are off. And, if they spend their time, in the main, discussing their own dilemma—in an almost monosyllabic reiteration of their woes—it is hardly to be wondered at. What these gentlemen are sorely in need of is some sort of an impulse which will change the direction of their gloomy thoughts. At the moment they are thinking only of themselves. And, self-pity was never the starting ground for saving action. They need sorely a new objective. A turn of business for the better would help them but this is not immediately to be expected since their affairs are acting as a terrible drag upon all business. When that is lacking, a first class fight with somebody over something might prove their salvation.

A far more serious phase of the question arises in this

The coal people had no large surplus of cash when they went into this experiment which men now call the Jacksonville seal. Such as they had has been lost in the meanwhile. The industry is definitely out of funds. It is, however, not without credit. The industry—even if we disregard recent liquidations—has never been over-capitalized. It always had a good half of its value free from any possible incumbrances. Therefore, it always had assets upon which conservative investors could lend money. However, to raise enough cash to finance the bituminous industry at this time would require the active participation of what we have learned to call “big money.” And, that same “big money” has—with eminent good sense—made it perfectly clear that it will not be enticed into an industry that is either labor ridden or bureau ridden. The coal industry is in the unfortunate position of needing the help which big money alone can give. Yet, it cannot, easily, attract that money for the reason that it is ridden by both organized labor and the bureaus. It may be that the relief from the pressure of one or the other of these things would supply the impulse which would start coal to thinking purposefully about its own future. The experiment is worth trying.

#### THE KANSAS INDUSTRIAL COURT

WHILE there is a general opinion that the decision of the Supreme Court of the United States “junks” the Kansas Industrial Court, the issue seems to be confused through various interpretations of that decision. Those who are in favor of its abolishment, however, point out that it is a “mistake to interpret the court’s decision as ending the possibility of strike legislation or compulsory arbitration in any industry. There is still the possibility that Congress or state legislatures may enact compulsory arbitration laws and that the Supreme Court will sustain them.” The court’s decision on this point is very clear:

“The extent to which regulation reasonably may vary greatly with different classes of business and is not a matter of legislative discretion solely, but is a judicial question to be determined with due regard to the rights of the owner and employees.

“Operating a railroad, keeping an inn, conducting an elevator and following a common calling are not in the same class.

“There are distinctions between a quasi-public business conducted under a public grant, imposing a correlative duty to operate; a business, originally private, which comes to be affected with a public interest because of a change in status; and a business which was not only private in the beginning but has remained so.”

But just what has the decision done to the Kansas Industrial Court? Has it rendered the entire act unconstitutional? According to the Hon. William Huggins, former presiding judge of that body, it has not. Rather he believes that the decision destroys the authority of the court to grant labor protection against low wages and unfair hours and working conditions, but leaves unimpaired the penal sections of the law which are intended to protect the public against the perils of industrial warfare. According to this interpretation of the decision, the court may not now fix wages, hours of labor, or working conditions in food manufacturing plants, in the coal mining industry and in the manufacture of clothing. But in transportation and in public utility services the law is unaltered. The penal sections which remain in full force are those which prohibit picketing, intimidation or duress of any kind, or the calling of strikes not for the honest purpose of bettering

conditions of the workingman but for the purpose of preying upon the industry itself.

Taking the Supreme Court’s decision literally as the final word, it is apparent that the Industrial Court will have no authority to fix wages, hours of labor or working conditions in the industries mentioned, even in case of great public emergency caused by strikes or other labor disturbances, but under Section 7 of the act the court will still have authority to investigate labor controversies, to subpoena witnesses, to take sworn testimony and make a record of same. Upon that evidence it may make findings of fact concerning the controversy; it may make recommendations, making them thereby a public record which may be published, and by which public opinion may be influenced. It still is a felony for any officer of any corporation engaged in any of the industries mentioned, or for any labor union officer whose workers are employed in these industries, to use the “power, authority, or influence incident to his official position to intentionally influence, impel, or compel any other person to violate” any of the provisions of the law prohibiting interference with these industries.

To those who have watched the experiment of the Kansas Industrial Court with friendly sympathy the decision of the Supreme Court is entirely understandable. The court, which originally started out as a court, clothed with judicial attributes of the highest order, became the political football of the state, and as such eventually came under political, rather than judicial, control. This change in the character of the tribunal, considered in connection with the recent decisions of the Supreme Court, would indicate that the real hope of industry lies not in the effort to accomplish by force that which should be accomplished by persuasion but rather in that plan so ably sponsored by the American Mining Congress—industrial cooperation—whose platform is summed up in the following declaration of principles:

“Industrial peace will be brought about only through confidence in management, and that that confidence can be secured only through a closer personal touch between management and employees.

“Future peace of industry will not be found in ‘organized employers’ and ‘organized employees’ that are created to fight each other.

“There is a common ground upon which every employer and employe can meet—a common ground born of confidence and sustained through a recognition of interdependence.”

#### SCANDALS OF YESTERYEAR

THE same political opportunists who today are scenting scandal in the petroleum industry yesterday were directing their diatribes against the meat packers, the sugar producers, the railroad managements, the steel manufacturers, the coal operators, the international bankers, the fertilizer makers, and the power interests. Tomorrow their castigations will fall upon other successful business or industrial groups. Demagogery moves in cycles, and the selection of the object of its calumny for a particular campaign depends largely upon fads of popular thought. Where are the scandals of yesteryear?

In the general reform of business ethics, beginning 25 years ago, the oil industry, because of its overwhelming size, was first the target and later the pattern for the reform of all business. The fault was not with the industry but with the concepts of the time. All business was filled with practices which have since been outlawed by statute. The abuse of rebates was coincident with



black Fridays and gold panics. The important thing about the industry is the fundamental soundness of the vast bulk of its structure. The same organizing minds which developed a large part of it, when turned to research in public benefaction, developed in the same sound way the huge concept of the Rockefeller Foundation whose service to humanity is incalculable.

#### THE HARMONIOUS RATE STRUCTURE

THE Interstate Commerce Commission makes much of its struggling toward a harmonious rate structure. At each step, some of its critics become increasingly severe in their condemnation. They go so far as to accuse the Commission of having adopted it with a view to predetermining the course which, in future, our commerce shall take. We are not able to agree with the critics because we believe that the Commission is seeking a desirable goal. However, we want to be specific in the definition of the keynote word, "harmonious," that we may all be thinking about the same thing.

That is, some of the Commission's critics pretend to believe that what the Commission means by a harmonious rate structure is a mere common denominator by which all rates are to be computed. They say that they would prescribe zones in which the commodities of certain sections may sell and from which—by the convenient device of an impossible rate—the commodities from other sections would be excluded. We happen to be neither the confidant of nor the apologist for the Commission. But, we realize that its members were drawn from ordinary walks of life and that, in the course of time, they will return whence they came. We credit them with the common sense of the common people. And we refuse to believe that they are ignorant of what every schoolboy knows—that the commerce clause of the Constitution was drawn to promote the trade of the country; to give broader markets to the producers and a greater variety of goods to the consumers. A rate structure in harmony with the constitution would serve that purpose. That is why we find it impossible even to assume that the gentlemen of the Commission are even contemplating a scheme to reduce our national commerce to little principalities of commerce, hedged about by rates which preserve the sovereignty of each against any possible encroachments of any other.

When, therefore, the Commission goes in strongly for a "harmonious rate structure," we believe it is trying to find something necessarily in harmony with the constitution and not less with human experience. For instance, Adam Smith said that all human activity consists of taking something from the ground; changing its form; and, moving it somewhere. In the primitive era, our principal concern was to take something out of the ground—largely something to eat and to wear. In recent generations, we have gone more into manufacturing—changing the form of what we took from the ground. Through both periods, transportation, while important, was a subordinate occupation. A harmonious rate structure—something in key with this situation—would preserve the carriers, of course, but would distribute the rate burden properly as between the raw materials and the finished product.

When we seek a rate structure which will benefit business without harming the carriers, we start with the obvious fact that the manufacturer must have raw material or he cannot proceed. The factory can go anywhere—next door to its market. But, the natural resource raw material must be produced where it is found.

This suggests that the manufacturer has great latitude as to the location of his plants, but the producer of raw material has no latitude at all. If the manufacturer is not to be handicapped in selecting his location, the raw materials must flow, with the least difficulty, to any point of manufacture he may elect. If we translate this situation into the evident intention behind the commerce clause of the constitution, it fits snugly. That is, the framers of the constitution wanted to arrange for the free movement of the products of the earth and wanted to so arrange things that everybody might have a chance to buy and to use them. If we translate this into a harmonious rate structure, it means the raw material must move to wherever anyone wants to build his factory to the end that the products of that factory may be made available to the people who surround it. The logic of it all is that we should have two rate theories—one for raw materials and one for finished products. If this has any restricted meaning—and we contemplated none when writing it—it is that raw materials shall be allowed as nearly as practicable a nation-wide market, whereas the manufactured products may be forced to accept a more narrow market. If, in order to give the railroads enough revenue, we must restrict the movement of anything, we believe the manufactured product rather than the raw material should be subjected to the zoning.

Our idea, therefore, of a harmonious rate structure—one in harmony with the constitution—is one which will guarantee a free movement of raw materials, even if the result is to limit the movement of the finished product. A factory can move. A mine cannot.

#### AN ECONOMIC MISFIT

THE existing difficulties in the Shipping Board and the Emergency Fleet Corporation afford—if we can salvage that much from a disagreeable situation—an excellent example of the difficulties which are encountered when government and business try to unite in a common enterprise. That is, when two definite organizations have such distinctly different aims and purposes, it is difficult to see how one can, with any satisfaction to either, serve as the agent of the other.

The facts are that to serve a then existing purpose, the government caused to be built a number of boats. When the purpose had been served, it still had the boats. In an effort to save something of their cost and value—until they could be conveniently disposed of—it was decided that selected persons, familiar with shipping affairs, should be employed to operate them for the government. The private operators, therefore, became the agents of the government to carry on a strictly business transaction in which the government found itself engaged. The agency, however, was never quite an agency in the true meaning of that word. The government—the authority always seemed nicely poised between the Shipping Board and the Fleet Corporation—reserved to itself the right to direct the detailed actions of the operators and seems to have reserved wholly to itself the matter of making the stevedoring contracts under which its operators must work and the cost of which the operators must pay. Thus the government staged an exhibition of eating its cake and keeping it—of having agents and still having none.

The resultant confusion may readily be imagined when the essential difference in purposes of the two parties is understood. In order to kill off the "spoils" system which once flourished in this country, the Congress, rather wisely, decided that any commissions which



were to be created thereafter should be bi-partisan. The Shipping Board is such an organization. The outstanding fact is that its members are chosen from the ranks of active workers in politics and that they represent, always, a clean cut division of political sentiment. It is not inconceivable that, where a matter of policy is so much in dispute as is the case of our merchant marine, one of these factions in the Board would be forever trying to put the whole administration in hot water over the policy of the board. That presents possibilities of opening wide the door for the freest play of what we choose to call politics and presents a serious handicap to any body who must try to function under it.

The operators, on the contrary, are supposed to be pure business men without any particular political complexions, except those which naturally attach to any citizen. These men are supposed to be pursuing a business end for a business purpose—to wit, to operate the boats for the purpose of making money for themselves. At that point, we run headlong into a serious difficulty. Any agent is always under a handicap for the simple reason that he is compelled, to an extent, to think with the mind of his principal. This requires fast guessing at times, even under the best of conditions. But when the principal is thinking with one mind, directed to one purpose, and when the agent is thinking with another mind directed to another purpose, it seems well nigh impossible for the two to agree. In this case, the operators seem to be engaged in the difficult task of trying to make money for themselves by the use of the government's boats while at the same time they are trying to satisfy the government which wants to save every possible penny. It smacks just a little of a pair of chickens struggling for possession of a worm, with such sure consequences to the worm as to leave no room for any play of the imagination.

The application of this situation to other matters in which the government has attempted to take a hand in our economic affairs is a little too obvious to require recitation. The fact is that business exists for one purpose and the government exists for another. It is shown in the case of the boats that private business cannot serve as the agent of the government. It would be possible to show, with equal conclusiveness, that the government cannot serve as the agent of private business. That is, it is impossible for a private business man to make money for himself while serving a government which does not want to make money. And, it is equally impossible for the government to undertake to try to make money for a business of a private nature for the very simple reason that public office cannot be used for the enrichment of one man at the expense of the many. It was a mistake ever to have tried to unite these two forces on one program. Now that they have been united, in certain particulars and in certain endeavors, it is a continuing mistake to allow the experiment to run. Each should stick to its own knitting.

The whole matter takes on a much more serious aspect when we look at it as a cause of war. The business people of all countries all around the world for all time have struggled against each other as private business men without ever involving the countries in war. But whenever the government and its business men have become one, those who complained about the success of the business men found their enmity directed at the government. This, always, has led to war. And it made no particular difference whether the governmental participation was direct or whether the government merely acted as the agents of the business men. When the two have, in any way been united, the opposition has found

an excuse for war. Seeing that public government and private business are an economic misfit when found in one business enterprise, it seems strange that our government agencies should insist upon trying to project the government into private business.

### THE FACTS ABOUT OIL

**O**IL has been for some time a popular theme for political agitation. In contradistinction to such thought the Federal Oil Conservation Board is attempting to assemble a real symposium of opinions and a compendium of facts with a view to formulating a national policy with respect to the problems of the petroleum industry. This board will find, while turning back the pages of history for information upon which to base a national policy for the future, that from the beginning of the oil industry to the present the popular conception was that a shortage of petroleum was imminent and that conservation was imperative, but that this conception never has been realized. No one has ever known whether the supply of oil is exhaustible or not. No one now living may ever know.

The oil industry when left alone to meet the demand has always met it. Increased consumption has always been met by increased production. A threatened shortage in the crude product has always stimulated research and investigation and resulted in refining processes and improved methods that met the condition of the hour. There is no more reason to believe that this will not be the case for many generations yet to come; and, instead of future generations being denied the benefits of oil that the present generation enjoys, they will enjoy even greater benefits resulting from the unrestricted evolution and progress of inventive and creative genius that is borne of necessity.

In the matter of price oil challenges comparison with all other commodities. The price of gasoline, since 1913, has been lower than the index price of all commodities. The prices of practically all other staple commodities have been higher during the 12 years since 1913. But this showing is largely due to the fact that the oil industry has been able to keep pace with increased consumption. If the industry should be hedged about with restrictions on drilling and with regulations governing operations, the future undoubtedly will tell a different story, and the public will suffer enormous increases in price.

In order to maintain an adequate production and supply of oil, conditions must be such that the wildcatter and speculator will continue to search for new fields; that neither the wildcatter nor the established producer shall be discouraged by the hazard of dry holes; that those engaged in experimentation for and improvement of methods and processes of producing and refining shall be assured of appropriate reward for success; and that capital shall continue to flow into the oil industry for its development and expansion.

The establishment of artificial conditions and the harnessing of the law of supply and demand by legislation of any kind designed to regulate private control and operation of the oil industry can only result in diminished production and supply and higher prices at a time when consumption is rapidly increasing. The oil industry should not be throttled or hedged about with any system of regulation that would deprive the industry of the advantages derived from private initiative and resourcefulness in meeting the needs of the consuming public.

## PREPARING COAL TO SECURE GREATER REALIZATION

*One Of The Major Topics To Be Discussed By Practical Operating Men At Cincinnati Is The Development Of Methods To Obtain Greater Realization For The Coal Sold. It Is Agreed That Profits Will Increase In Direct Proportion To The Percentage Of Lump Coal, And An Attempt Will Be Made To Show How This May Be Done*

IN adopting the slogan "Lower Costs per Ton" the coal mining industry refers more generally to the possibilities of reducing its costs through the adoption of more efficient methods of mining. The program committee for the Cincinnati meeting in selecting the subjects that were of uppermost importance in the minds of the coal mine operator, among others, included "Effective Cutting and Shooting Methods to Secure Greater Realization" as being one in which advancement may be obtained through joint discussion. The management of the convention has therefore set aside one entire session for the discussion of this important phase of mining, and will devote the morning session of May 29 to it. The program as outlined for this particular session will include a presentation of effective methods in connection with horizontal cuts in top, bottom and middle, the shearing of coal, the snubbing of coal, proper shooting of coal, together with a discussion of the methods which may be utilized in tippable preparations. Operators who have had special experience and great success in the application, methods and practice for these various angles of this subject will present their viewpoint, which will be followed by general discussion of the entire problem. Among the speakers announced by the convention management are: C. E. Reynolds, mine superintendent, Allegheny-Pittsburgh Coal Company, Parnassus, Pa., who will discuss "Horizontal Cuts in Top, Bottom and Middle"; George Peart, assistant general manager, Rocky Mountain Fuel Company, Denver, Colo., on "Shearing"; L. E. Young, general manager, Union Colliery Company, St. Louis, Mo., on "Snubbing"; Charles Wagner, Glen Alden Coal Company, Scranton, Pa., and T. G. Frear, general superintendent, Inland Collieries Co., Indianola, Pa., on "Shooting," and C. W. Smith, chief engineer, Illinois Coal Corporation, Chicago, Ill., on "Tippable Preparation."

George F. Osler, vice-president and general manager, Pittsburgh Terminal Coal Company, Pittsburgh, Pa., will act as chairman of this important session, and in commenting upon the possibilities of the discussion, Mr. Osler points out:

"Among the subjects to be discussed at the National Exposition of Coal Mining Equipment of the American Mining Congress at Cincinnati is 'Effective Cutting and Shooting Methods to Secure

Greater Realization.' Coupled with this subject is 'Tippable Preparation.'

"These subjects are closely allied as they have to do with careful handling of coal so as to reduce to a minimum the degradation during mining and preparation for market.

"The committee in formulating their program endeavored to pick subjects having to do with cost reductions and increased realization; inside and outside preparation are the phases in coal production which help most.

"The mining of coal in a manner which will increase the percentage of larger sizes is as vital as reductions in costs.

"In most cases under normal conditions smaller sizes of bituminous coal do not bring more than 60 percent of the price of screened coal.

"Coal for run-of-mine business should have the same careful handling as screened coal, for consumers of this class of fuel register as many complaints on fine coal content as for any other cause.

"The present condition of the coal markets make it almost impossible to sell at a price that will allow the producer to break even, and the larger the percentage of fine coal produced, the lower the mine run realization will be.

"Tippable preparation covers not only the proper screening and cleaning of coal, but also care in handling during preparation from dumping point until it is loaded into railroad cars. Properly prepared coal is more readily marketed at a price in excess of same grade poorly prepared.

"The success of the meetings in Cincinnati will depend absolutely on the audiences, as the talks will be more or less informal, and it is the hope of the committee that the discussions will bring out valuable and helpful information.

Dr. Henry Mace Payne, consulting engineer to the American Mining Congress, in discussing this problem, asserts that the operator must always keep in mind every possible cost reduction and at the same time realize his largest profit on "lump coal." Continuing, Dr. Payne asserts:

"Coal preparation is a coordination of processes beginning with cutting, followed by shooting, and culminating in its passage over the tippable onto the railroad cars.

"Coals vary so widely in their stratification and friability that no set rule can be established governing their han-

dling. It can be said, however, that the ultimate aim is, in all cases, its reduction to a minimum degradation of the product.

"The operator must always keep in mind every possible cost reduction and at the same time realize on his product the highest possible market grades, which invariably means 'lump coal.'

"The position and nature of the undercut may be so varied as to become a middle or top cut, or in extreme cases, shearing. The cutting machine manufacturers have equipped themselves to provide standard machines with cutters for operation in any of these positions.

"In certain mines the location of slate or clay partings has rendered it not only feasible but economical to cut these partings and load out the bug dust first; the balance being all clean coal and containing only such slack as is inevitable from shooting and handling.

"The placing of the holes is an art which must be developed in each particular mine and vein to meet conditions as they may there exist. The choice of explosives is an entirely independent equation which likewise is the result of experience, observation and experiment. To say that any given explosive is the best for use in bituminous coal would be as futile as to prescribe nux vomica for every ill of mankind.

"It may be stated as a general axiom that profits will increase in direct proportion to the percentage of lump coal. In most cases the smaller sizes of bituminous coal do not bring more than 60 percent of the price of screen coal.

"There are many consumers who can use and who are perfectly satisfied with run-of-mine coal provided it is properly prepared, free from slate, and not 'shot to pieces.' This grade of coal should receive the same care that the higher grades receive.

"Tippable preparation covers not only proper screening and cleaning of hand-picked refuse, but also the proper handling from dump to screens, and from screens to car. Properly prepared coal will always bring a higher price than the identical coal poorly prepared.

"Free and full discussion of this problem at the National Exposition of Coal Mining Equipment of the American Mining Congress at Cincinnati will be productive of valuable and helpful information.

## EFFICIENCY MEANS PROFIT IN COAL PRODUCTION

*The Real Problem Of The Coal Operator Is To Secure Lower Costs In Coal Mine Operations And The Major Purpose Of The Cincinnati Meeting Is To Offer An Opportunity To Get Together During The Week Of May 25th For An Informal Discussion Of The Problems That Daily Confront The Operator In His Effort To Produce Coal Economically, Efficiently And Profitably*

By E. C. PORTER\*

ONE of our greatest basic industries—coal—has been for some time confronted with many difficult problems. Its relationship to the public, the threat of legislative annoyance and governmental interference, the shackles of a semi-monopoly of its labor under the control of a militant and aggressive union, all these, and many more ills, have added to the burden of the coal operator. But in the final analysis, the real and integral problem, which in its solution lays the basis for the solution of all of the other problems relating to the stabilization of this industry, is the question of securing lower costs per ton through the application of improved and more effective methods, practice and mechanical equipment.

Until recently the development of co-operative effort in the coal mining industry through national and local organizations has been to a very large extent focused upon what might be called the incidental problems of the industry. Policy questions have been the matters which have been most widely discussed and comparatively little attention has been given to a consideration of bringing about an interchange of the best thought in the industry in connection with practical operating problems. These aspects of the coal mining industry have been left largely to the consideration of local associations of engineers and other similar bodies. Their work has been excellent and has proved helpful in many different districts, but until a year ago, no concerted effort had been made to bring about and establish a meeting place for the entire coal mining industry where its practical operating officials, those in charge of and responsible for production costs, might gather and discuss in an informal way the practical operating problems of the industry.

In fact, the meeting which was held in Cincinnati in 1924, and which was brought about by the simultaneous meeting of the National Coal Association and the American Mining Congress was the first of its type and its success proved that there was a widespread demand among operating officials for the opportunity of securing and interchange of thought and ideas and it indicated the wisdom of creating a permanent gathering of this character.

The annual meeting of coal operating officials to be held in Cincinnati, Ohio, May 25 to 29, simultaneously with the National Exposition of Coal Mining Equipment and Machinery, has for its primary object, therefore, the creation



Louis S. Cates, President, The American Mining Congress

of a medium through which practical operating men from all of the different mining districts may come together, discuss their operating problems and by the interchange of ideas return to their individual operations better fitted to apply effectively improved methods, practices and equipment.

It is generally agreed throughout the coal mining industry that the application of new forms of mechanical equipment which will in turn eliminate a large amount of the labor which is now necessary and which through the process of development will result in lower costs is the outstanding problem of the industry. During the past two years there has been a remarkable development in the application of mechanical equipment for the cutting and loading of coal. In some instances and under certain conditions, such equipment when effectively operated results in a lowering of from 30 to 40 percent of the cost per ton. At the

same time it is fully realized that mechanical loading equipment still is in its infancy, that none of the machines that have so far been developed can be relied upon effectively under any and all conditions. In connection with the use of loading machines, there must be a mutual adaptation of mining methods and in all probability the development of new methods of haulage and transportation.

Naturally the coal mining industry is greatly interested in this whole question of mechanical loading and the value of an annual gathering of coal operating officials is clearly shown by the fact that the operator attending the Cincinnati meeting will be able to secure a summary of the results which have been obtained through the use of mechanical loading machines in all of the different mining districts and will also have the benefit of the exhaustive investigation of mechanical loading which has been carried on not only under the auspices of the United States Bureau of Mines but of several other agencies.

What is true of mechanical loading is equally true of the very interesting question of the control of mining equipment. The development of the use of electrical equipment in coal mining enterprises has been phenomenal during the past few years and many engineers are now working along the line of application of automatic control to different phases of mine equipment, including mine pumps, various types of tippie machinery, and the whole question of the general haulage system. The application of remote control to mine equipment obviously reduces considerably the use of day labor which has become so large a factor in the labor cost of mining operations. The control of mine equipment is another subject which is still in its very earliest stages of development. The application of such control is a matter which will become of greater and greater prominence during the next few years. Operating men in many mining districts are still unfamiliar with this question. Comparatively few mines have actually attempted to install different types of such control but its value is appreciated and there will be a successful development leading to increased application.

Here again the Cincinnati meeting provides an effective means whereby the

\*Convention Manager, The American Mining Congress.



electrical engineers and operating men in coal mining districts have the opportunity of participating in an informal discussion which will bring out the very best thought and best application of control as applied to different coal mining operations.

These two illustrations indicate the purpose and object of the Cincinnati meeting. The program was worked out by a representative committee made up exclusively of well known operating men, as follows:

R. L. Kingsland, Superintendent, Power and Mechanical Department, Consolidation Coal Co., Fairmont, W. Va.; Lee Long, Vice President, Clinchfield Coal Corporation, Dante, Va.; Abner Lunsford, General Manager, Fordson Coal Co., Stone, Ky.; E. L. Thrower, General Manager, Warner Collieries Co., Cleveland, Ohio; C. M. Means, Consulting Engineer, Pittsburgh, Pa.; W. L. Affelder, Chairman, Assistant to the President, Hillman Coal and Coke Co., Pittsburgh, Pa.; W. G. Duncan, Jr., General Superintendent, W. G. Duncan Coal Co., Greenville, Ky.; George F. Osler, Vice President and general Manager, Pittsburgh Terminal Coal Co., Pittsburgh, Pa.; H. Foster Bain, Director, U. S. Bureau of Mines, Washington, D. C.; J. C. Layne, Jr., Secretary, Eaton-Rhodes Co., Cincinnati, Ohio; James W. Needham, General Manager, St. Paul Coal Co., Chicago, Ill.; Graham Bright, Consulting Engineer, Howard N. Eavenson and Associates, Pittsburgh, Pa.; A. C. Callen, Department of Mining Engineering, University of Illinois, Urbana, Ill.; C. E. Leshner, Assistant to President, Pittsburgh Coal Co., Pittsburgh, Pa.

This program has been based upon the belief that the discussions at Cincinnati should be discussions of the problems which are of greatest interest to the practical operating official and it was also the belief of the Program Committee that these discussions should be led by operating officials in coal mining enterprises or engineers acting as consultants in connection with the application of methods and equipment to coal mine operations.

The entire series of conferences has been built, therefore, upon the belief that the interchange—the informal interchange of the best thought and experience of the coal mining industry would be of the greatest constructive value in connection with the effort of executives, superintendents, managers, engineers and all others connected with coal mining operations to solve the most important and the perennial problems in coal mine operations, namely, to secure the lowest possible costs per ton and the greatest possible realization through the proper preparation of the coal.

This meeting in Cincinnati has had the cordial cooperation of a wide group

## PROGRAM

### Discussions And Other Features Of The National Exposition Of Coal Mining Equipment And Machinery

#### MONDAY, MAY 25, 1925

7.30 P. M.—MUSIC HALL AUDITORIUM  
Formal opening National Exposition of Coal Mining Equipment and Machinery.

#### TUESDAY, MAY 26, 1925

10 A. M.—Music Hall Auditorium.

**SUBJECT: "Mechanical and Electrical Equipment Problems."**

Chairman: R. L. Kingsland, Superintendent Power and Mechanical Department, Consolidation Coal Company, Fairmont, W. Va.

1. "The Use of Acid Resisting Metals for Mine Drainage Equipment."

Comments—J. A. Malady, Electrical Engineer, Hillman Coal & Coke Co., Pittsburgh, Pa. .... 10.00-10.10  
Discussion ..... 10.10-10.20

2. "Speed Reducers."

Comments—H. D. Smith, General Superintendent, American Coal Co., McComas, W. Va. .... 10.20-10.30  
Discussion ..... 10.30-10.40

3. "Economies Which Can Be Effected by the Proper Use of Watthour Meters."

Comments—William Lamont, General Superintendent, Sterling Coal Co., Bakerton, Pa. .... 10.40-10.50  
Discussion ..... 10.50-11.00

4. "General Use of Storage Batteries in Mines."

Comments—J. B. Hicks, Electrical Engineer, Consolidation Coal Co., Fairmont, W. Va. .... 11.00-11.10  
Discussion ..... 11.10-11.20

5. "The Hazards of Stray Currents."

Comments ..... 11.20-11.35  
Discussion ..... 11.35-12.00

#### TUESDAY AFTERNOON

1.30 P. M. TO 3.30 P. M.—MUSIC HALL AUDITORIUM

**SUBJECT: "Control of Mining Equipment."**

Chairman: C. M. Means, Consulting Engineer, Pittsburgh, Pa.

"Mine Pumps."

Comments—W. H. Lesser, Mechanical Engineer, Madeira, Hill and Company, Frackville, Pa. .... 1.30-1.40  
Discussion ..... 1.40-1.50

"Mine Fans."

Comments—L. W. Householder, Chief Engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa. .... 1.50-2.00  
Discussion ..... 2.00-2.10

"Tippie Machinery."

Comments—W. C. Adams, Consulting Engineer, Allen & Garcia Co., Chicago, Ill. .... 2.10-2.30  
Discussion ..... 2.30-2.40

"Mine Haulage."

Comments—Graham Bright, Consulting Engineer, Pittsburgh, Pa. .... 2.40-3.00  
Discussion ..... 3.00-3.10

"Automatic Sub-Stations."

Comments—T. F. McCarthy, Electrical Engineer, Clearfield Bituminous Coal Co., Indiana, Pa. .... 3.10-3.20  
Discussion ..... 3.20-3.30

#### WEDNESDAY, MAY 27, 1925

10 A. M. TO 12 NOON—MUSIC HALL AUDITORIUM

**SUBJECT: "Mechanical Loading in All Its Phases."**

Chairman: Eugene McAuliffe, President, Union Pacific Co., Rock Springs, Wyo.

1. "Underground Loaders in Use Today."

Introductory remarks, giving descriptions of different types of machines now in use, by a representative United States Bureau of Mines, covering recent investigations of loading machines, illustrated with lantern slides ..... 10.00-10.30

Comments—F. E. Cash, United States Bureau of Mines, Pittsburgh, Pa.; E. H. Johnson, United States Bureau of Mines, Pittsburgh, Pa.

2. "Practical Experience in the Use of Mechanical Loaders."

Comments—Abner Lunsford, General Manager, Fordson Coal Co., Stone, Ky. .... 10.45-11.00  
Discussion ..... 11.00-11.10

Comments—Edward J. O'Toole, General Superintendent, United States Coal & Coke Co., Gary, W. Va. .... 11.10-11.25  
Discussion ..... 11.25-11.35

Comments—T. F. Whalen, General Superintendent, Pittsburgh & Erie Coal Co., Pittsburgh, Pa. .... 11.35-11.45  
Discussion ..... 11.45-12.00

#### WEDNESDAY AFTERNOON

1.30 P. M. TO 3.30 P. M.—MUSIC HALL AUDITORIUM

**SUBJECT: "Practical Experience in the Use of Mechanical Loaders."**

Chairman: Eugene McAuliffe, President, Union Pacific Coal Co., Rock Springs, Wyo.

Comments—George B. Harrington, President, Chicago, Wilmington & Franklin Coal Co., Chicago, Ill. .... 1.30-1.45  
Discussion ..... 1.45-2.00

Comments—I. N. Bayless, General Superintendent, Union Colliery Co., Dowell, Ill. .... 2.00-2.15  
Discussion ..... 2.15-2.30

Comments—J. W. Devison, General Manager, New England Fuel & Transportation Co., Grant Town, W. Va. .... 2.30-2.45  
Discussion ..... 2.45-3.30

Comments—Cadwallader Evans, Jr., General Manager, Hudson Coal Co., Scranton, Pa.

#### WEDNESDAY EVENING

Smoker and Entertainment.



## THURSDAY, MAY 28, 1925

10 A. M. TO 12 NOON—MUSIC HALL

## AUDITORIUM

**SUBJECT: "Mutual Adaptation of Mining Methods and Loading Machines."**

Chairman: Abner Lunsford, General Manager, Fordson Coal Co., Stone, Ky.

1. "With Thick Coal and Thin Coal Under Varying Roof Conditions."

Comments—T. E. Jenkins, General Manager, West Jellico Coal Co., Sturgis, Ky. ....10.00-10.10

Discussion .....10.10-10.20

Comments—Edward Graff, General Superintendent, New River Coal Co., MacDonald, W. Va. ....10.20-10.30

Discussion .....10.30-10.40

2. *Some Successful Adaptations.*

Comments—H. S. Gay, General Manager, Gay Coal & Coke Co., Mt. Gay, W. Va. ....10.40-10.50

Discussion .....10.50-11.00

Comments—F. E. Dunlap, General Manager, Helena-Straven Coal Co., Straven, Ala. ....11.00-11.10

Discussion .....11.10-11.20

Comments—W. G. Duncan, Jr., General Superintendent, Duncan Coal Co., Greenville, Ky. ....11.20-11.30

Discussion .....11.30-12.00

## THURSDAY AFTERNOON

1.30 P. M. TO 3.30 P. M.—MUSIC HALL  
AUDITORIUM

**SUBJECT: "Utilization of Face and Other Portable Conveyors."**

Chairman: T. W. Dawson, Consulting Engineer, H. C. Frick Coke Co., Scottsdale, Pa.

Comments—E. F. Miller, General Superintendent, Bertha Consumers Coal Co., Rachel, W. Va. ....1.40-1.50

Discussion .....1.50-2.00

Comments—A. M. Ogle, President, Vandalia Coal Co., Indianapolis, Ind. ....2.00-2.10

Discussion .....2.10-2.20

Comments—F. G. Wilcox, President, West End Coal Co., Scranton, Pa. ....2.30-2.40

Discussion .....2.40-2.50

Comments—G. B. Southward, Electrical Engineer, West Virginia Coal & Coke Co., Elkins, W. Va. ....2.50-3.00

Discussion .....3.00-3.10

Comments—E. B. Raiguel, Chief Engineer, Coal Service Corporation, Huntington, W. Va. ....3.10-3.20

Discussion .....3.20-3.30

## THURSDAY EVENING

6 P. M.—HOTEL GIBSON—BALLROOM

## Informal Dinner

**SUBJECT: "Watchman, Tell Us of the Night."**

Speaker: H. L. Gandy, Executive Secretary, National Coal Association, Washington, D. C.

**SUBJECT: "Some Problems of the Anthracite Producers."**

Speaker: E. W. Farker, Director, Anthracite Bureau of Information, Philadelphia, Pa.

**SUBJECT: "The Real Issue."**

Speaker: J. F. Callbreath, Secretary, American Mining Congress, Washington, D. C.

**SUBJECT: "The Financing of Coal Mining Properties and Improvements."**

Speaker: Robert K. Cassatt, Cassatt and Company, Philadelphia, Pa.

8 P. M.

**SUBJECT: "Advantages of Graphic Charts in the Interpretation of Coal Mine Costs."**

Speaker: W. L. Affelder, Assistant to the President, Hillman Coal and Coke Company, Pittsburgh, Pa.

Illustrated with slides.

## FRIDAY, MAY 29, 1925

10 A. M. TO 12 NOON—MUSIC HALL  
AUDITORIUM

**SUBJECT: "Effective Practice and Actual Costs of Rock Dusting."**

Chairman: A. C. Callen, University of Illinois, Urbana, Ill.

Comments—Arthur Neale, General Manager, Pittsburgh Coal Co., Pittsburgh, Pa. ....10.15-10.30

Discussion .....10.30-10.40

Comments—Dan Harrington, Consulting Engineer, Newhouse Building, Salt Lake City, Utah. ....10.40-10.55

Discussion .....10.55-11.05

Comments—W. C. Holman, Chief Engineer, Phelps-Dodge Corporation, Dawson, N. Mex. ....11.15-11.25

Discussion .....11.25-12.00

## FRIDAY AFTERNOON

1.30 P. M. TO 3.30 P. M.—MUSIC HALL  
AUDITORIUM

**SUBJECT: "Effective Cutting and Shooting Methods to Secure Greater Realization."**

Chairman: George F. Osler, Vice-President and General Manager, Pittsburgh Terminal Coal Co., Pittsburgh, Pa.

1. "Horizontal Cuts in Top, Bottom and Middle."

Comments—C. E. Reynolds, Mine Superintendent, Allegheny-Pittsburgh Coal Co., Parnassus, Pa. ....1.45-2.00

Discussion .....2.00-2.10

2. "Shearing."

Comments—George Peart, Assistant General Manager, Rocky Mountain Fuel Co., Denver, Colo. ....2.10-2.25

Discussion .....2.25-2.40

3. "Snubbing."

Comments—L. E. Young, General Manager, Union Colliery Co., St. Louis, Mo. ....2.40-2.50

Discussion .....2.50-3.00

4. "Shooting."

Comments—Charles Wagner, Glen Alden Coal Co., Scranton, Pa.; T. G. Frear, General Superintendent, Inland Collieries Co., Indianola, Pa. ....3.00-3.10

Discussion .....3.10-3.20

5. "Tipple Preparation."

Comments—C. W. Smith, Chief Engineer, Illinois Coal Corporation, Chicago, Ill. ....3.20-3.30

Discussion .....3.30-3.40

of different coal mining associations. It has had the endorsement and cordial cooperation of the two great national bodies representing the coal mining industry in connection with policy matters and every indication points to the hearty interest and support of the coal operating officials themselves.

The Cincinnati meeting represents an effort to serve the industry effectively and to aid it by developing cooperation among its own members in creating an effective medium whereby each year at some centrally located point it will be possible to bring together the practical operating men to report on the year's progress and to indicate the effective use by which greater efficiency can be secured and lower costs per ton obtained.

## THE NATIONAL EXPOSITION OF COAL MINING EQUIPMENT AND MACHINERY

In the carrying out of the general plan of the annual meeting of coal operating officials to discuss their practical operating problems, the National Exposition of Coal Mining Equipment and Machinery plays an important part and is a permanent feature of these meetings.

There is a unanimous agreement in the fact that cutting costs in coal operations is primarily dependent on the development and practical application of new and improved forms of mechanical equipment. Mechanical loading machines, the use of face and other portable conveyors, the adaptations of mining methods to these machines are some of the best illustrations of the way in which improved machinery and mechanical equipment is laying the foundation for the real solution of the problems of the coal mining industry, and what is true of this particular phase of adaptation of machinery and coal mine operations is equally true of the entire range of mechanical equipment in coal mining enterprises.

In the development, therefore, of a plan for bringing together the practical operating men in the coal mining industry to discuss their problems, it is essential that at the same time opportunity should be afforded for the creation of a closer contact between the manufacturer of mine equipment and the operating officials responsible for coal mine production.

The National Exposition of Coal Mining Equipment and Machinery affords the effective medium under the supervision of the Manufacturers Division of the American Mining Congress for bringing together the manufacturing side of the industry into close contact and cooperation with the practical operating men.

This does not mean that in any sense of the word the Cincinnati meeting will be devoted to the development of sales

of different types of mechanical equipment. That is not the object of the exposition, for the real reason for the Exposition of Coal Mining Equipment lies in the necessity of creating a real and close working understanding between those who are producing machinery for coal mines and those who have to utilize such machines in their enterprises.

The National Exposition of Coal Mining Equipment and Machinery in Cincinnati will be the largest and, in many ways, the most interesting display of mechanical equipment and supplies which has yet been staged. The 125 displays which will make up the exposition will include examples of practically every type of the latest forms of mine equipment and machinery and supplies.

The mechanical loading machines will, of course, be a feature of the exposition, and there will be in all probability from three to four machines exhibited in operation at the exposition, and, in addition, other concerns manufacturing mechanical loaders will have on display in their booths either working models or moving pictures of their machines in operation. In fact, one of the features of the program will be an illustrated talk made by a representative of the Bureau of Mines covering all of the different types of mechanical loaders now in use.

The control of electrical equipment will be a feature of the program of discussions, and displays of different types of electrical equipment and devices for sectionalizing control will also be a feature of the Exposition. These will include automatic circuit breakers, devices for sectionalizing control of electrical equipment, automatic control for different types of pumps, fans and all the other phases of mining equipment as well as displays illustrative of electrical equipment used in the haulage system.

In addition there will be a fine display of mine locomotives, of mine track-work, various types of coal washing machines and of other devices for the preparation of coal, as well as fine exhibits illustrative of explosives and other types of supplies used in shooting coal.

There will also be interesting displays illustrative of the different types of equipment used in the effective cutting

and shooting of coal and the primary and secondary preparation of coal at the tippie.

Haulage is a great factor in coal mine operations and the Cincinnati Exposition will be notable because of the representative displays of different types of mine cars and of the roller-bearing equipment used in securing greater efficiency in coal mine transportation.

Generally speaking the 125 displays will cover the entire range of coal mine equipment and will be indicative of the wealth of inventive genius and the practical application of this genius in connection with the manufacturing concerns which are today rendering so great a service both in the production of machinery as now used and in carrying on the development of such machinery in such a way as to secure much greater results in the future.

The following exhibitors will cooperate with the operators in solving these important questions, showing special equipment outlined in the following review:

**Allen and Garcia Co., Chicago, Ill. Space No. 19**

A model will be shown which is one-sixteenth size of a five-track coal screening and preparation plant, including

designed for mine-pump motors, a type "P" 3-pole, 440-volt, safe-for-all enclosed circuit breaker constructed with a special terminal board making it possible to remove circuit breaker from the line. Type BT-3 bearing thermostat relays, TR universal thermal relay, and a full automatic substation shown in operation.

**Barrett, Haentjens and Co., Hazleton, Pa. Space No. 106**

Will show a complete automatic centrifugal pump set up in such a way as to demonstrate how pumps of this type can be made to run themselves without constant attendance. In addition there will be a display of strainers, check valves and other accessories.

**Bassick Manufacturing Co., Chicago, Ill. Spaces Nos. 29 and 30**

Alemite products for lubricating all types of mining equipment and machinery will be included in this exhibit. Models will be shown of mine car wheel lubrication and of the use of Alemite industrial lubricating system and Alemite lubricants.

**Bethlehem Steel Company, Bethlehem, Pa. Spaces Nos. 119 and 120**

A 1217 parallel throw switch stand, Bethlehem mine ties, manganese frogs, rail templets, grim rail clamps, steel sprag, coupling link and pins, steel ties.

**Broderick and Bascom Rope Co., St. Louis, Mo. Space No. 28**

In this space will be shown a tramway bucket, model of friction grip, illumi-

crank-drive Allen and Garcia Petersen pendulum-hung screens and belt picking tables; a model of Allen and Garcia designed all steel mine car, including semi-automatic coupler; together with photographs illustrative of Allen and Garcia installations for coal and rock-salt mines.

**American Cast Iron Pipe Co., Birmingham, Ala. Space No. 102**

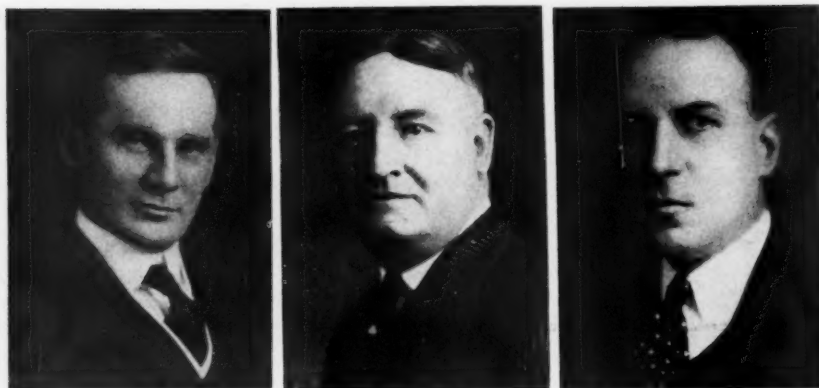
Cast iron pipe for mines—in diameters of 2, 3, 4, and 6 inches. Material known as Simplex Prepared Joint can be easily moved and set up with wrenches. Rust resisting and effective.

**Atlas Powder Company, Wilmington, Del. Space No. 12**

General line of explosives, including all types of blasting powder used in coal mine operation.

**Automatic Reclosing Circuit Breaker Co., Columbus, O. Space No. 73**

This display will include MSB automatic reclosing sectionalizing circuit breaker; a type "Q" control equipment, comprising a type "Q" handle, mounted on controller top, a type MR-2 line switch, a type OR-3 overload relay which can be mounted on almost any mine locomotive, a type "SS" starter



*Coal Men Who Are Directors of The American Mining Congress: Top—Carl Scholz, Hugh Shirkie, and J. G. Bradley. Below—D. B. Wentz and A. J. Nason*



**Cincinnati Mine Machinery Company, Cincinnati, O. Space No. 92**

Special cutter chains for all types of mining machines and other mining machine accessories.

**Coal Age, New York City. Space No. 117**

An exhibit of the editorial and advertising service rendered to the Coal Mining industry by Coal Age.

**Coal Mine Management, Chicago, Ill. Space No. 104**

Reception booth and display of publications.

**Concordia Electric Co., Pittsburgh, Pa. Space No. 116**

Various types of "CEAG" electric safety lamps for mines such as cap lamps, hand lamps, locomotive lamps, thrift lamps, mule lamps, together with latest design of "CEAG" cap lamp with a 4-volt battery of the dry electrolyte type, giving strong and well distributed light.



nated tramway pictures, sample board showing all types of wire rope, together with different types of wire rope, including ornamental fencing.

**Carnegie Steel Co., Pittsburgh, Pa. Spaces Nos. 42 and 43**

Carnegie steel mine ties, steel cross-ties, rails, mine timbers, wheels, axles and other accessories.

**Cement-Gun Co., Allentown, Pa. Spaces Nos. 26 and 27**

The display will consist of the "Cement-Gun," also a Traylor 13 inches by 8 inches mine-type electrically driven compressor, a horizontal type, double-acting, slow-speed compressor, delivering 225 cu. feet of free air per minute at 80 pounds pressure with a special rocker axle and other important features.

**Central Frog and Switch Co., Cincinnati, Ohio. Space No. 77**

Frogs, switches, turnouts, switch stands of various types, steel ties, extension points, re-railers, "Handy Rail Clamps" and other accessories.

**Chicago Pneumatic Tool Co., New York City. Space No. 2**

Portable electric and pneumatic coal drills, specially mounted electric coal drills, and permissible (flame-proof) electric coal drills and pneumatic rock drills. There will also be pneumatic and electric drills for wood and metal drilling and reaming, electric hammer drill for concrete and rock drilling, a pneumatic riveting hammer, and a mine car portable and stationary air compressors.



*Officers of the Manufacturers' Division, The American Mining Congress: Top, left—J. C. Wilson, Chairman; right—N. S. Greensfelder, Honorary Chairman. Below—H. K. Porter, H. A. Buzby, and C. L. Herbater, Vice-Chairmen*

**Cutler-Hammer Mfg. Co., Milwaukee, Wis. Space Nos. 22, 23, 24.**

A full automatic substation illustrating a.c. control equipment, d.c. control equipment and a motor generator set.

**Deming Company, Salem, Ohio. Space No. 38**

Jupiter "Oil Rite" mine gathering pump, mounted on wheels and axles, a Vitrox sectional water end for above pump, a complete set of parts for power, a crank shaft for a Triplex pump, crank gear and set die cast bearings.

**Diamond Machine Company, Monongahela, Pa. Space No. 112**

One LeGrabon mine dusting machine together with literature illustrative of the application of rock dusting in coal-mine operations.

**Dravo-Doyle Company, Pittsburgh, Pa. Spaces Nos. 3 and 4**

Austin mine pumps with anti-acid check valves, Curtis automatic gathering pump valves, a sample lot of bronze bearings, valves for centrifugal pump control, a DeLaval centrifugal pump,

and a centrifugal worm gear.

**Driver-Harris Co., Harrison, N. J. Space No. 103**

The display will include a "Cimet" (chrome iron) mine pump and fitting castings in rough and finished condition, together with performance charts and descriptive literature.

**E. I. Du Pont de Nemours and Co., Inc., Wilmington, Del. Space No. 39**

Display cabinet showing imitation cartridges of blasting and sporting powders. Also display of Ventube for mine ventilation, samples of brattice cloth and exhibit of fuse manufactured by Ensign-Beckford Co.

**Edison Storage Battery Co., Orange, N. J. Spaces Nos. 46 and 47**

Animated exhibit showing a cross section of a mine with storage battery locomotives, illuminated photographs of the Edison Storage Battery Company's plant at Orange, N. J., and various photographs illustrative of the Edison Storage Batteries in mine locomotives.

**Electric Railway Equipment Co., Cincinnati, O. Space No. 111**

Sample board and a complete lot of loose samples showing over-head trolley line materials for coal-mine operations.

**Electric Railway Improvement Co., Cleveland, O. Space No. 53**

A complete line of Arc Weld Rail Bonds with samples actually applied to rail sections, also portable arc welding and bonding equipment and accessories.





**Electric Storage Battery Co., Philadelphia, Pa. Spaces Nos. 8 and 9**

Latest type Exide Iron Clad Storage Batteries for the propulsion of storage battery locomotives, together with assembled cells cut away to show latest type of construction, and complete assembled cells showing method of assembly. In addition, there will be on display a complete line of the latest type of radio batteries.

**Enterprise Wheel and Car Corp., Bristol, Va.-Tenn. Space Nos. 108-109**

Enterprise Wheel and Car Corporation mine cars, together with roller-bearing trucks.

**Fairbanks, Morse and Co., Chicago, Ill. Space No. 25**

The exhibit will consist of a 3-inch double-suction motor-driven centrifugal pump completely equipped with ball-bearings, capacity 425 gallons per minute against a 190-ft. head, a 5 by 6 special motor-driven single-cylinder mine gathering pump, a sectionalized ball-bearing motor.

**A. France Focquet, Liege, Belgium. Spaces Nos. 90 and 91**

This exhibit will be made up of a model of the Rheo-Washer illustrating a coal cleaning system which has been effectively used throughout Europe and is now being introduced into American coal operations.

**Frederick Iron and Steel Co., Frederick, Md. Space No. 113**

Frederick Coal Separator, Frederick Feeder, Frederick Loading Boom and Frederick Centrifugal Mine Pump.

**General Electric Co., Schenectady, N. Y. Spaces Nos. 15, 16, 17**

Six-ton, low-height, gathering locomotive equipped with contactor control and automatic sectionalizing switch equipment for mine service, line material, rail bonds, etc.

**Goodman Manufacturing Co., Chicago, Ill. Space No. 36**

Various types of photographs illustrative of the line of mining, cutting and loading machinery manufactured by the Goodman Manufacturing Co.

**Harris Pump and Supply Co., Pittsburgh, Pa. Space No. 10**

La Bour motor-driven self-priming pump with stand, 1 Harris motor-driven priming unit, 1 No. 344-A Morris bronze high life pump, together with Harris multi-post valves, Harris wood pipe connectors and strainers.



Members of the Program Committee:  
Below—George F. Osler. Above—C. E. Lesher, C. M. Means, R. L. Kingsland, and H. Foster Bain

**Heisler Locomotive Works, Erie, Pa. Space No. 67**

Model of the Heisler locomotive, together with photographs illustrative of the utilization of these locomotives in mining enterprises.

**Hendrick Manufacturing Co., Carbon-dale, Pa. Space No. 107**

Perforated metal screens, elevator buckets, "Mitco" sidewalk grating, "Mitco" Shur-sits treads, and flanged lip screens.

**Hercules Powder Co., Wilmington, Del. Space No. 5**

Complete information on explosives, blasting supplies, and their uses, together with copies of "The Explosives Engineer" and the trophy to be awarded to the coal mine winning the National Safety Competition now being held under the auspices of the U. S. Bureau of Mines.

**Hockensmith Wheel and Mine Car Co., Penn., Pa. Spaces Nos. 34 and 51**

A composite (steel and wood) mine car, as designed and patented by the Hockensmith Wheel & Mine Car Co., and

constructed for the Lilly-Brook Coal Co., Sullivan, W. Va. Car gives maximum capacity for minimum overall height, width and length. Can be used with present equipment.

**Hurlburt Oil and Grease Co., Philadelphia, Pa. Space No. 66**

Samples illustrative of the different types of Hurlburt greases of various densities shown in different size containers.

**Hyatt Roller Bearing Co., Newark, N. J. Spaces Nos. 33 and 52**

Bearings for mine cars, conveyor idlers and drives, mine fans, electric motors, all types of mine locomotives and general machinery and equipment.

**Jeffrey Manufacturing Co., Columbus, O. Spaces Nos. 54, 55, 56**

A section of the new Jeffrey "Sectional Conveyor," together with a Jeffrey Blower for Ventilating Mines, and a one-reel picture illustrative of the operation of the new Jeffrey Loading Machine. In addition there will be photographs of different types of Jeffrey machines used in coal-mine operation.

**Joy Machine Company, Pittsburgh, Pa. Space No. 90**

Moving pictures, showing operation of Joy Mechanical Loaders in various coal mines. Descriptive literature together with engineering data and other information.

**Keystone Cons. Publishing Co., Pittsburgh, Pa. Space No. 13**

Mining catalog (coal edition), coal catalog (combined with coal field directory), geographical coal field maps of coal producing territories, maps include names of names of mines, coal producing companies, equipment data, loading capacity, etc. Distributed in steel "Rolup" case 19 by 38 inches, which hangs on wall.

**Keystone Lubricating Co., Philadelphia, Pa. Spaces Nos. 78 and 79**

Complete layout of the Keystone Safety Lubricator and accessories (semi-automatic and automatic) together with photographs illustrative of installations on underfeed stokers and shaker screens as well as demonstration of lubricants for various types of mine car wheels and other equipment.

**King Powder Co., Cincinnati, O. Space No. 64**

Empty shipping containers for explosives, dummy dynamite cartridges and a display of the ingredients used in the manufacture of King products.





**Koppel Industrial Car and Equipment Co., Koppel, Pa. Spaces Nos. 93 and 94**

Standard mine cars and other types of railway material accessories used in coal-mine operations.

**Koehler Manufacturing Co., Marlboro, Mass. Space No. 18**

Different types of safety mine lamps, including the Wheat electric safety mine lamp, together with charging rack for lamp, charging panels, rectifiers and demonstrating equipment, together with the Koehler flame safety mine lamp, horseshoe magnets, electro magnets, igniters, tools and complete mine lamp house equipment.

**Lead Lined Iron Pipe Co., Wakefield, Mass. Space No. 31**

Acid-resisting lead-lined iron pipe, acid-resisting lead-lined flange valves, acid-resisting lead-lined flange fittings, and galvanized amalgamated lead-lined iron pipe fittings and pipe.

**Lincoln Steel and Forge Co., St. Louis, Mo. Spaces Nos. 68 and 69**

Lincoln trucks for mine cars, Lincoln self-aligning journal boxes, small model of car, aluminum models of trucks, Lincoln type S automatic greasing machines for mine cars, Lincoln hand greasing cabinet, Lincoln grease plugs and Lincoln slide rail holder.

**Lorain Steel Co., Johnstown, Pa. Spaces Nos. 80 and 81**

Standard mine cars, together with frog and switch materials for track work in coal-mine operations.

**Lunkenheimer Company, Cincinnati, O. Space No. 14**

A high grade line of valves, boiler mountings, cocks, lubricating devices and will include water gauges, fusible plugs, oil cups, oil pumps, grease cups and Lunkenheimer Super-Pressure Valve.

**E. S. McKinlay Mining & Loading Machine Co., Pt. Pleasant, W. Va. Space No. 92**

A model of the McKinlay cutting and loading machine, together with photographs illustrative of installations in operation in coal-mine enterprises.

**John H. McGowan Co., Cincinnati, Ohio. Space No. 110**

Solid-case, single-stage, belt-driven centrifugal pump; horizontal split-case,



Members of the Program Committee: Below—W. L. Affelder, Chairman. Above—Lee Long, Graham Bright, A. C. Callen, and E. L. Thrower

single-stage, motor-driven centrifugal pump; horizontal split-case, three-stage, motor-driven with flexible couplings for connections for driving units, and other different types of duplex pumps with top motor mounting and photographs illustrative of pumps used in coal-mine operation.

**Mine Safety Appliances Company, Pittsburgh, Pa. Space No. 11**

Edison electric safety mine lamps, Gibbs oxygen breathing apparatus, first-aid supplies and equipment, gas masks and resuscitation devices of the latest type, precision instruments showing methane indicators, carbon-monoxide protectors, pyrotannic detectors for carbon monoxide and other types of safety apparatus.

**Mining Safety Device Co., Bowers-ton, O. Space No. 44**

Nolan automatic cager, two sets of horns, together with a Nolan automatic cager and feeder to cross-over and kick-back dump, together with one Nolan semi-automatic feeder, as well as small models of other machines.

**The Mining Congress Journal, Washington, D. C. Space No. 121**

Reception booth for delegates, copies of the Exposition Edition, and other literature.

**The Morse Chain Co., Ithaca, N. Y. Space No. 118**

A full line of chain samples, together with a 100-horsepower chain-drive in operation with roto-scope attached to clearly show the rocker-joint action as the chain enters and leaves the sprocket. Another feature of the exhibit will be a balopticon operated automatically and continuously showing on a screen a series of views of Morse chain drives used in mines and mills in all parts of the world.

**Myers-Whaley Co., Knoxville, Tenn. Space No. 59**

Myers-Whaley Underground Shoveling Machine, "The All-Around Loading Machine for Coal Mine Work," shown in operation. In addition there will be shown a model of the Myers-Whaley machine in motion, together with complete illustrated printed matter indicating the effective use of these machines.

**Modern Mining, Pittsburgh, Pa. Space 100**

Standard trade publication.

**National Carbon Co., Inc., New York City. Space No. 83**

Complete line of carbon and metal graphite brushes, both for motor, generator and rotary converter service. There will also be samples illustrative of the raw materials entering into the manufacture of carbon and metal graphite brushes, together with welding carbons, welding paste, together with literature descriptive of the various products.

**Newport Rolling Mill Co., Newport, Ky. Space No. 91**

A display of sheet roofing, galvanized roofing, including the products of the Newport Rolling Mill Co., the Globe Iron Roofing and Corrugating Co., and the Andrews Steel Co.

**Niles Bement Pond Co., New York City.**  
*Space No. 32*

Ground Maag spur-gear speed-increasing unit, motor 200 H. P., 1750 R. P. M. to 3750 R. F. M., on a 6-in. center distance, 1 cut Maag spur-gear reduction unit, motor 25 H. P., 900 R. P. M. to 300 R. P. M., unit ratio 1 to 6 on a 10-in. center distance, also various examples of Maag gears, spur, helical, herringbone and spiral.

**R. D. Nuttall Co., Pittsburgh, Pa.** *Space No. 84*

Mine locomotive and coal-cutting machine gears and pinions of the Nuttall standard quality heat treated by the BP tough hard process. In addition there will be samples of complete trolley and trolley-pole equipment, featuring electric steel, centering spring pole head.

**Ohio Brass Co., Mansfield, O.**  
*Space No. 45*

Full line of trolley line equipment for mines, rail bonds, high-tension insulators, electric arc welders, head-lights, and feeder-line equipment.

**Philadelphia Storage Battery Co., Philadelphia, Pa.** *Space No. 65*

Type PML exhibition board, an exhibition cell type 9 PMS, 3 cells type 39 PML, together with different types of batteries, also a radio exhibition stand and illustrative literature and photographs.

**Phillips Mine and Mill Supply Co., Pittsburgh, Pa.** *Space No. 58*

Reception room and literature giving full information in regard to the various types of mine supplies manufactured by this company.

**Post-Glover Electric Co., Cincinnati, O.**  
*Space No. 57*

Post-Glover homanite steel resistance grids, W-W selfstarters, transite and ebony asbestos woods, panelboard and switchboard products, together with Post-Glover canopy switches.

**Raymond Bros. Impact Pulverizer Co., Chicago, Ill.** *Space No. 105*

Operating model of the Raymond Bros. Impact Pulverizer Company Roller Mill for fine grinding, and in this operating model during the convention limestone will be ground to a fine powder, illustrating what can be done in making rock dusting materials.

**Rail Welding and Bonding Co., Cleveland, O.** *Space No. 72*

Various types of Una bonds and welding equipment for mine service, together with actual demonstration of the application of Una bonds on mine rail.

**John A. Roebling's Sons Co., Trenton, N. J.** *Space No. 6*

Wire rope, wire-rope fittings, copper trolley wire, gas and electric welding wire, insulated wires and cables, also moving picture, "The Story of Wire Rope."

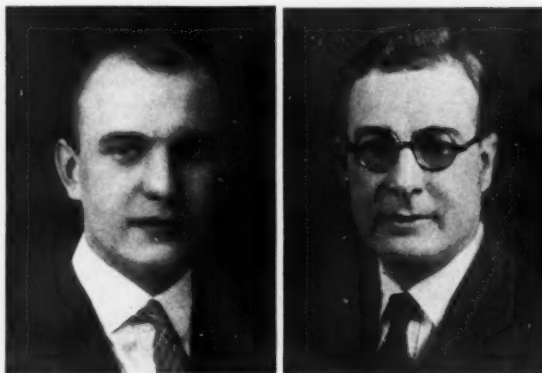
**Rome Wire Co., Rome, N. Y.** *Space No. 88*

Super Service "Cords and Cables," including single conductor locomotive cables, parallel duplex mining-machine

cables, concentric mining-machine cables, portable conductor mining-machine cable in 600 and higher voltage cables, also "Super Service" miners' lamps and blasting cord.

**Sanford-Day Iron Works, Knoxville, Tenn.** *Spaces Nos. 61, 62, 63 and 95*

A model mountain with miniature coal mine and automatic stop bottom mine cars in operation, together with moving pictures illustrative of the use of automatic cars in mine operation in different sections. There also will be power and hand grease guns and all types of standard roller-bearing trucks,



A. F. Brosky

Ralph C. Becker

together with models of large capacity whopper end gate and rotary dump cars.

**Simons Paint and Spray Brush Co., Dayton, O.** *Space No. 21*

The exhibit will include paint spray-brush equipment, various types of spray brushes for handling paints or other liquids on wood, metal, concrete or other surfaces, also for the cleaning of machinery, houses, furniture, refuge places in mines, tunnels, etc., portable air compressors for supplying air with which to operate the paint spray-brush apparatus operated by either motors on DC or AC current or by gasoline engines.

**Simplex Wire and Cable Co., Chicago, Ill.** *Space No. 50*

Distribution cables, welding cables, samples of Tirez mine cables and bore-hole cables and all other types of cable equipment for coal-mine operation, together with illustrated material and engineering data showing the effective use of Simplex cables in mining enterprises.

**S. K. F. Industries, Inc., New York City.** *Space No. 41*

A display of Skayef self-aligning ball and roller bearings, together with a number of interesting models which will show the anti-friction qualities of S. K. F. marked bearings.

**Streeter-Amet Weighing and Recording Co., Chicago, Ill.** *Space No. 1*

Automatic weight indicating and recording machinery for weighing moving loads.

**Strom Ball Bearing Mfg. Co., Chicago, Ill.** *Space No. 70*

Strom ball bearings as used in all types of mining machinery featuring the new Super-Strom ball bearing, to-

gether with mine-locomotive transmission cut away to illustrate the Strom ball-bearing installation.

**Sullivan Machinery Co., Chicago, Ill.**  
*Space No. 20*

Sullivan roller cut bit sharpener, motor-driven, in operation and one Sullivan single-drum electric portable hoist, also in operation.

**Templeton, Kenly and Co., Ltd., Chicago, Ill.** *Space No. 89*

Simplex jacks, with safety automatic raising and lowering—all steel and light in weight.

**Timken Roller Bearing Co., Canton, O.** *Space No. 76*

Applications of Timken roller bearings to mine cars, belt conveyors, line shaftings, pillow blocks and other phases of mine equipment.

**Tool Steel Gear and Pinion Co., Cincinnati, O.** *Space No. 37*

Gears, pinions, sprockets, specially hardened and toughened by the tool steel process, together with crane-track wheels, conveyor wheels, hardened bushings, etc.

**Bertrand P. Tracy Co., Pittsburgh, Pa.** *Space No. 71*

Coal loading machines conveyors, together with repair parts for cutting machines and locomotives.

**W. S. Tyler Co., Cleveland, O.** *Spaces Nos. 114-115*

Four-foot single-body tandem HUMMER screen, 1 RO-TAP testing sieve shaker, 1 Delatester (float and sink testing machine) together with samples of screen cloth.

**Watt Mining Car Wheel Co., Barnesville, O.** *Space No. 40*

Standard Watt mine cars illustrative of the various mine cars in effective use in many coal-mining operations.

**Waverly Oil Works, Pittsburgh, Pa.**  
*Space No. 35*

Various types of Waverly lubricants used in all types of coal equipment and machinery.

**Weinman Pump Mfg. Co., Columbus, O.**  
*Space No. 7*

Weinman self oiler, mine gathering pump shown in operation, together with a single-stage electric double-section ball-bearing centrifugal pump and a type "H" electric centrifugal pump, together with important parts of the self-oiling pump.

**Weir Frog Co., Cincinnati, Ohio.** *Spaces Nos. 74, 75, 82*

Standard types of mine rails, switches, frogs, turnouts and all other types of rail track and rail-track accessories manufactured by this company.

**Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.** *Spaces Nos. 85, 86, 87*

An interesting demonstration of the effectiveness of the Westinghouse Electric & Manufacturing Co.'s semi-magnetic controller in rupturing heavy currents. Two type 904-C mine motors will be directly coupled together so that one motor can be loaded into the other.

There will also be an interesting demonstration of a Westinghouse type YR-4 cable reel, together with a type 944-A-5 mine motor which will be displayed disassembled to show the internal construction. In addition there will be parts of the Baldwin-Westinghouse bar-steel locomotives together with an illustrative display of the new designed sealed-sleeve bearings, magnetic push-button starters for squirrel-cage motors, portable arc welder of the resistance type to be used for light repair work, together with a new type control for large AC hoists with an air-operated electrically controlled switch.

**West Virginia Rail Co., Huntington, W. Va. Spaces Nos. 48 and 49**

Complete sections rolled by the West Virginia Rail Company, a full line of steel mine ties, rigid and spring switch stands of various designs, heavy duty riveted plate frog, alloy steel frog and manganese steel frog, a complete steel turnout, together with a complete unit of switch, frog stock rails, guard rails, etc., on steel ties.

**Williams Tool Corp., Erie, Pa. Space 101**

A special line of tools effectively used for coal mining equipment and machinery.

**RESURVEY OF OIL SHALE IN GARFIELD COUNTY, COLO.**

A RESURVEY of the great oil shale district in Garfield County, Colorado, to be resumed by government surveyors within the next few weeks, is expected to result in the unearthing of a number of illegal and fraudulent mineral locations, according to the Interior Department.

Because of the rich deposits of oil shale with a potential output running into a hundred million barrels, the area is completely plastered with numerous mining claims, and plans are being made by the General Land Office to enter on the plats only those claims the validity of which is unquestioned.

In the resurvey of the district under a special act of Congress, all claimants will be required to present satisfactory evidence that they have complied with the law not only in making their locations but also in spending the necessary annual assessment for development. Along with the actual surveying of the land in the field an investigation is being conducted into the various placer mining claims to ascertain whether they are meritorious and whether frauds have been committed against the Government.

Another feature of the survey, which had added greatly to its difficulty, is that many of the placer claims overlap each other. This is due to the fact that marks of the original survey made by contract surveyors have been completely or partially obliterated. Inaccuracies in the original surveys have been discovered in which the corner positions are defective. A discrepancy of 3 miles occurred in some places in the lines. Most of these discrepancies exist in the vicinity

of the First Standard Parallel where there are also a large number of mining locations.

In view of the magnitude of the interests involved, every effort is being made by the Interior Department to expedite the resurvey as well as protect the interests of the Government. Already six of the eight townships in this district of Colorado have been surveyed. The work upon the two remaining townships will be prosecuted as rapidly as possible during the coming summer. So far the sum of \$41,000 has been expended on the resurvey. It is estimated that the cost will exceed \$50,000 before the entire eight townships are completed, all of which is attributable to the serious errors or fraud perpetrated when the lands were first surveyed under the old contract system.

The General Land Office announced that, although the placer mining claims extended almost in unbroken groups throughout the De Beque shale district, the rights of the holders of legitimate mining claims would be protected, while no step would be left untaken to throw out illegal and fraudulent claims. It was stated also that this preliminary examination into the validity of the placer locations would not constitute a final adjudication of them. The General Land Office announces that the time required for the preparation of the returns of these resurveys as they are completed in the field, looking to the restoration of the lands to entry and disposal, will be materially shortened through the recent act of Congress placing the offices of surveyors general, where the plats and field notes are prepared, directly under the supervisor of surveys. This change makes it possible to coordinate the field and office work which heretofore has been administered by two separate and independent organizations.

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An investigation looking to the revival of hydraulic mining by installing centrifugal pumps along rivers to pump out silt from mining operations over adjoining lands is provided for in a resolution before the California Legislature. It is believed the investigation will show the project to be feasible, and that it will result in working many miles of rich gravel channels.

The Geological Survey has issued a contour map of the surface of beds underlying Cherokee shale in a part of the Ficher district of Oklahoma showing relations of ore bodies. It was made at the request of operators of lead and zinc mines in the Joplin region, which is now producing most of the zinc output of the country. "Scarcely a single shale patch in the Joplin region has escaped the prospector," says the Survey.



## CAN MECHANICAL LOADING REPLACE HAND MINING

*Old Ways Of Mining Are Becoming Inadequate—New Methods Must Be Adopted. Mechanical Loading Is Among These—Mr. Southward Asserts That In Considering Various Ways Of Adapting Loading Machines, Two Methods Of Approach Are Necessary—Development Of A Machine To Fit Present Mining Systems And Development Of A Mining System To Fit Mechanical Loading*

By G. B. SOUTHWARD\*

WE say that we are living in the Mechanical Age, but it is important to realize fully that the underlying reason for the adoption of mechanical methods by our modern industries was simply because these methods proved better. With our increasing needs and changing conditions older and established methods become inadequate and necessity forces the invention of new ways. We call this progress, but this is simply another name for existence, because in order to exist we must progress. There is nothing new in this—it has been said thousands of times and was put into practice long before it was ever put into words.

We who are engaged in coal mining are having this truth brought home to us rather forcibly. Most of us are realizing, or have already realized, that the old ways are becoming inadequate to meet the new conditions and that those of us who are to exist must change from our present ways and devise new methods for meeting the changing conditions. It is altogether logical in this mechanical age to assume that our improvements must be made through mechanical operations and that this is the present trend of thought in mining is evidenced by a number of mechanical methods that are now being devised.

Among the most important of these is mechanical loading, which has now been developed well beyond the experimental stage. Of course, there will be improvements in the types now in operation and there will doubtless be new types designed on different principles from those now employed, but we are safe in saying that the loading machine has arrived and whether we like it or not it is here to stay. Loading coal is principally a material handling operation and we have only to look to other industries to convince ourselves that there is no mechanical obstacle in the way of its success. It is therefore well worth our while to consider for what conditions the mechanical loader is best adapted and in what manner it may best be used, but in considering these questions it must be realized that this is essentially a mining rather than a

mechanical problem, and the answer must be determined by mining men.

It is frequently stated that mechanical loading is limited to fairly thick seams of clean coal. Certainly such seams are favorable for any system of mining, but the question to be determined is how far can mechanical loading be applied beyond these limits. The earlier machines were designed for thick



*Joy Mining and Loading Machine*

seams but later types have been developed for lower coal until now it is reasonably safe to assume that some type of mechanical loader can be designed for any height of seam desired. A moderately clean seam is at present essential, as a loading machine which will separate impurities from the coal has not yet been devised. Probably it never will be, but this fact will not necessarily limit the future of mechanical loading to clean seams as there is always the possibility that mechanical separation of impurities will sooner or later prove more economical and efficient than hand picking. Until this time arrives the loading machine is limited to seams whose impurities can be economically removed by present preparation methods. Hand loading, however, is also restricted in the same manner, though

not to the same degree, but every new successful separating method or device increases the limits of mechanical loading. It may therefore be said with considerable assurance that already a great many of our mines have conditions suitable for mechanical loading in its present state of development and the number of such mines will increase with each new improvement in loading and cleaning methods.

In considering various ways of adapting a loading machine to coal mining, there are two methods by which the question will be approached. The first is by developing a machine which will fit our present mining systems and the second is by developing a mining system to fit mechanical loading. Unquestionably the solution will be a combination of these two methods, but we may reasonably expect to see radical departures from our present systems, which were developed by and for hand loading, therefore, the first point to be considered and decided is how far our present mining systems are adaptable to machine loading and in what respect must they be changed.

There are certain fundamental requirements for mechanical loading that must be provided for in the mining system, but the varying underground conditions will not permit of the same solution in every case. For example, since transporting the loading machine must be held to a minimum, the mining method must supply a large quantity of coal at each loading place, with a short distance to travel between such places. Wide rooms with thin pillars may be one solution, but this will not provide a sufficient amount of coal for mechanical loading at each place except where the seam is very thick or where roof conditions will permit driving exceptionally wide rooms. Another objection to this is that complete recovery cannot be obtained with a loader. Longwall mining answers this latter objection, and it will also give continuous loading. These are two favorable recommendations for this method, but unfortunately longwall mining is restricted to certain roof conditions. In both of these standard mining systems the efficient use of mechanical loading

*(Continued on page 238)*

\*Chief Engineer, West Virginia Coal & Coke Company.



## MECHANICAL LOADING IN THIN VEIN COAL MINES

*The New River Company Has Been Experimenting With Mechanical Loading For A Period Of Seven Or Eight Years—In This Article Mr. Graff Tells Of The Various Conditions It Has Been Necessary To Meet And Their Method Of Treatment*

By EDW. GRAFF\*

THE method of mechanical mining and loading of coal has been experimented with for the past several years. During the last three or four years great progress has been made and today there are several machines on the market with varied degrees of success, depending entirely upon the conditions in the mine where the loading machine is working.

It is becoming more apparent every day that coal must be mined cheaper, and, as there are mines working in seams of coal having a thickness of five to eight feet and others working in seams of coal from three to four feet thick, consequently, it is necessary for the operators who are working in thin seams to devise some means whereby they can mine coal cheaper in order to compete with operators who are operating mines in the thick seams.

Most of the mechanical coal loaders have been designed for thick seams and cannot be adapted to the mines working in the thin coal, consequently, if they are successful it gives the thick vein operator additional advantage over the thin vein operator. It is then up to the thin vein operator to devise means whereby thin coal can be worked at a cost which will allow the operation to continue in business.

The company I am with (The New River Company) is working mines in the Sewell seam of coal in Fayette and

thick. In a few places there is sand-rock top but this condition is rare.

The Sewell seam which we are working is under a very heavy cover, in some cases 1,100 feet, which necessarily requires a very large pillar between rooms.

About seven or eight years ago we started projecting the mines with rooms on 90-foot center to center, entries on 60-foot center to center.

We endeavored to drive the rooms 18 feet wide and during the last three or four years our aim has been to drive entries to destination before turning rooms, and then turn room, beginning at the inby end of entry.

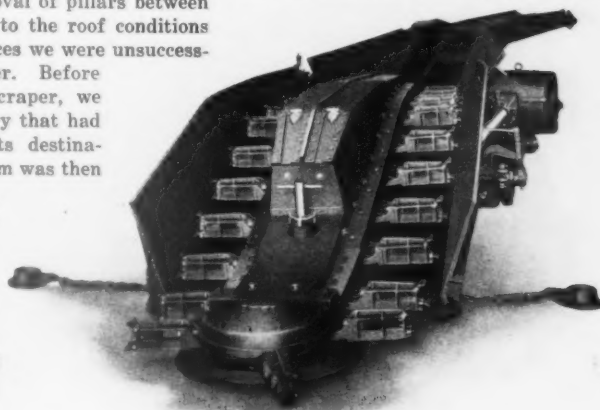
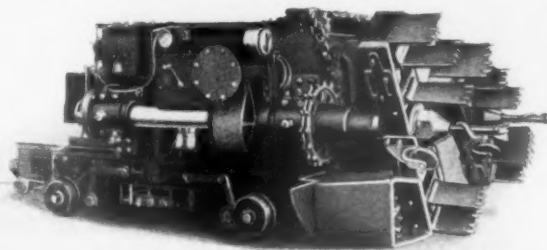
During the progress of all this development, we have kept in mind mechanical loading. We have tried the scraper loader and Joy loader but neither of these machines were suitable for our conditions.

In 1917 or 1918 we tried the scraper loader on the removal of pillars between rooms, but owing to the roof conditions at some of the places we were unsuccessful with the loader. Before abandoning the scraper, we tried it on an entry that had been driven to its destination. The last room was then turned and driven through to a

8 feet thick) began breaking around the cribs; then the slate finally took the face. This long face of coal was recovered and we removed eight or ten more cuts from the face, and lost the face the second time. We tried the third time with the same result, and finally had to remove the rest of the coal by hand.

At one of our other mines we had a section of sand rock top. We drove the rooms on 120-foot center to center, then retreated with pillars having faces of 100 to 110 feet. We got very good results, but as we had very little sandrock top in any of our mines, we decided the scraper was not suitable for our mines.

We then investigated the different makes of conveyors, as we thought by having conveyors along the face we could make more speed in the removal of the coal thereby keeping ahead of the weight that might come on the pillar, but the only conveyors that were on the market were from 12 inches to 20 inches high and required shoveling of coal on conveyor. I did not think this



Left — McKinlay Mining and Loading Machine. Right — The Coloder Mining and Loading Machine

Raleigh counties, in West Virginia. This coal ranges in thickness from 3 feet to 4½ feet. We therefore consider our mines in the thin vein class, and we have realized for the past several years the necessity of mining coal mechanically.

The roof directly over the coal in this field is slate; with few exceptions this slate runs from 1 foot to 6 or 8 feet

worked out area, thus giving a face of practically 200 feet in length.

In removing this pillar, we used three lines of cribs, always removing the back row and setting them near the face when the cut was loaded out. With this method we removed practically 400 feet of the pillar, thereby making an area of 200 feet by 400 feet.

The overburden then began taking weight on the cribs, the cribs becoming harder to remove and, finally, the slate (which in this particular place was 6 or

economical in low coal, so we did not try any of them out. I felt that we should have a conveyor to lie on the bottom and require little or no shoveling of coal onto it, but we were unable to get a conveyor of the type we wanted.

We have tried the Joy loading machine and where we had a small section of 4 feet, 5 inches of coal we got very good results with the machine so far as loading the coal was concerned but we did have trouble supplying empty cars to the loader as cars had to be placed one at a time. Therefore, the machine was idle practically one-half of the time waiting on cars. (Continued on page 238)

\*Mining Engineer, The New River Company, MacDonald, West Virginia.

## MECHANICAL LOADING IN METAL MINES

**T**HE subject of mechanical loading in the mining industry has been one that has been making rapid development. Experimental work in the metal industry has shown more concrete results, than the adaptation of loaders in the coal mining industry, where experiments are still in the early stages. The American Mining Congress through its committee on Mechanical Loading Underground, under the auspices of the Standardization Division, through its chairman, Mr. Lucien Eaton, Cleveland-Cliffs Iron Company, Ishpeming, Michigan, has submitted to the American Engineering Standards Committee, recommendations for approved and standard American methods, practice and equipment, with reference to mechanical loading. These recommendations are the result of five years' intensive work, by a most able committee, under the leadership of Mr. Eaton, and include special recommendations on (1) Loading Machines for Tunnels, Large Drifts, and Stopes; (2) Loading Machines for Small Drifts, and for work on sub-levels, and (3) Scrapers. The Mining Standardization Correlating Committee, subsidiary to the American Engineering Standards Committee, is now forming the reviewing committee, composed of representatives of all interested organizations, Engineers, Manufacturers, and the Government, which will make recommendations to the American Engineering Standards Committee concerning the adoption of the recommendations of the Committee of the American Mining Congress, on Mechanical Loading, as national standards.

The United States Bureau of Mines, in cooperation with the Missouri School of Mines and Metallurgy, just has released a publication upon this important subject, edited by Charles E. Van Barneveld. They point out that:

"This bulletin is the result of several years' study of various types of equipment in the different classes of mines, conducted by the Bureau of Mines.

"Recent improvements in design and construction of loading machines have markedly changed the general attitude of mining men toward mechanical loading. At first they were distinctly unfriendly and distrustful. Operators felt that under pre-war conditions, with a reasonable supply of fairly efficient labor, mechanization of loading was not attractive, and they hoped for a partial return to these conditions. They were not convinced that mechanical loading was a logical development

and were disinclined to undertake the development of loaders or to lend their mines for experiments in loader development conducted by others. Early machines proved unreliable, although there are notable exceptions to this general statement. Some operators, who recognized that mechanical loading was the next step ahead, bent all their energies to developing machines to suit their conditions. Others readily bought and tried the various machines brought out and cooperated with the manufacturer, who sought to improve his machine to suit the needs of the industry. Thus both manufacturers and users gradually learned what constituted a properly designed and built machine and what constituted its proper use.

"The underground loading machine must be strong enough for a very hard service. A mechanical loader must operate under unexpected and abnormal strains and is subject to more carelessness, neglect, and abuse than similar machinery on the surface.

"The machine should be adapted to as large a variety of operating conditions as possible within the particular range for which it is specially designed. The machine should be able to move in after blasting and to move out after loading with the least loss of time, with the provision that when machines mounted on continuous tread are used the condition of the bottom will be an important factor. Due consideration should be given to the question of travel about the mine, as distinguished from the daily moving within its operating radius, which should be as free and unrestricted as possible.

"The price of a loading machine is an important consideration, but unfortunately is often allowed to overshadow the main issue, reliability. The cumulative cost of frequent repairs and overhauling and delays to the entire mining operation is such, assuming the question of adaptability to operating conditions to have been settled, that reliability is the essen-

tial requirement of a loading machine.

"The advantage gained by speed in loading will be wholly lost if loaders can not be kept in continuous operation. In order that mechanical loaders may be efficient the accessory equipment, comprising track, cars, haulage, underground storage, hoisting plant, and surface storage must be proportioned to the service.

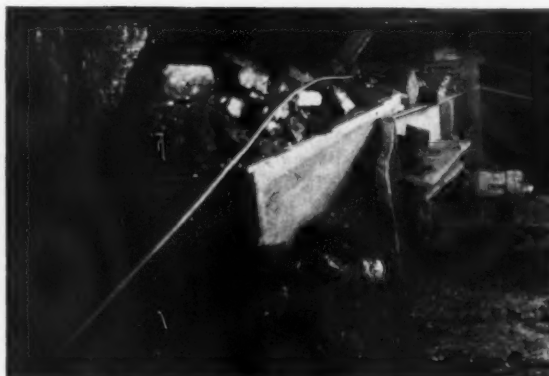
"When mechanical loading is introduced every effort is usually made to get along with existing tracks and equipment, whether suitable or not. As a rule tonnages involved are fairly large. Production may be fairly well scattered, particularly when the change makes available for mining low-grade reserves left from former operations. This calls for relatively fast transportation, which in turn demands standardization of haulage equipment and of track—good track-work is essential.

"Loading machines are operated by compressed air or by electric power. Some manufacturers can furnish loaders operated by either power; others specialize in one or the other. Steam and gasoline operated machines are not adaptable to underground work.

"A number of loading machines that differ very radically in design, in construction, and in adaptability have been developed to the commercial stage. There is no universal loader, and there never will be, because of the wide variations in underground conditions and requirements. Each mine is really an individual problem for which the different factors must be stated and analyzed in relation to one another.

"Mechanical loading has come to stay, and is destined to be increasingly important in the fuller utilization and the more economical exploitation of ore deposits now being forced by the constantly widening demand for the base metals and the nonmetallic minerals. The successful application of mechanical loading is squarely up to the management of a mine and requires intelligent selection and planning good supervision, and whole-hearted cooperation all along the line. There are now available enough reliable mechanical loading appliances to satisfy the entire range of requirements in the mining of metallic and nonmetallic minerals.

"Information regarding various types of locomotives used in connection with underground loading processes is contained in the bulletin. The adaptation of steam shovels to underground mining is discussed at some length. (Continued on page 238)



McClevey Loader of the Pike County Coal Corporation

## CONTROL OF MINE EQUIPMENT

*No Phase Of The Development Of Mine Equipment Is Of Greater Importance Than Automatic Control, And It Is Certain That Such Control Will Materially Cut Operating Costs—In This Article Mr. Adams Discusses Controls For Tipples, Preparation Plants, Fans, Converting Units and Locomotives*

By W. C. ADAMS\*

**C**ONTROL equipment that will be satisfactory for mine service must be reliable and simple in order to secure continuity of operation which is necessary for the economical production of coal. To secure this reliability of operation, the equipment must be especially rugged and of a design that will function properly under the usual mine conditions. Equipment must be positive in operation and as nearly trouble-proof as possible and simple in adjustment.

The determination of the proper type of control equipment that may be applicable to electrical equipment used in coal mining is, like everything else connected in a coal mine, dependent on the conditions under which it is to operate, and the results that must be obtained. The system of control is very important and upon it may depend the successful operation of the equipment so controlled.

A discussion of control for coal mines unless it is based upon existing or assumed specific conditions, must in most cases be general.

In this article no attempt has been made to cover control problems applying to equipment, the operation of which must necessarily be especially applicable to specific conditions that may exist. Controls for tipples, preparation plants, fans, converting units and locomotives are discussed in general.

### TIPPLE CONTROL

The early applications of individual motor drives to tipples were comparatively simple problems, since these plants at that time consisted mainly of a screen and an occasional conveyor. The controls for the motors driving these units were hand operated and placed as near the units as was possible, and at the same time be accessible for operation.

The demand for better and more economical preparation and loading has necessitated the modern tippie with its feeder to the screen, screen picking tables, loading booms, degradation conveyors, rock disposal equipment, and car retarders for regulating the travel of the railroad cars in process of loading.

With such an institution hand operated starters scattered throughout the tippie is no longer practical. A central control station where the control equipment can be started, stopped and regulated as to speed by one attendant, is now almost essential for the satisfactory

operation of a modern tippie or preparation plant.

The location of such a station must be primarily such that the attendant can readily see the loading points, for he must control the dropping of the cars by means of car retarders, and the position of the loading booms if breakage in loading is to be avoided. From this central point the attendant must also, as a safety measure, see each individual unit.

If these requirements are borne in mind during the designing of the structure, it is usually possible to secure such a location. An exception may necessarily be made in the case of a very large tonnage mine where the control of all the units by one man is humanly impossible. In such a case two stations should be used and properly interlocked to provide for cascade system of starting and stopping, by which the equipment is operated in proper sequence, thereby preventing the piling up of coal at any point.

The centralization of the control obviously makes it necessary to use semi-automatic control for each unit—that is, the equipment is started, shut down, and regulated as to speed, in normal operation by push buttons, further operation being automatic. The speed control features may be provided by controlling the necessary contactor by push buttons to secure the required speed points and speed range. Control units must also embody safety features for protection of equipment, such as overload trips and low voltage protective relays.

The standard controllers as offered by the manufacturers control the starting in acceleration period by one of two methods, namely, current limit relays and time limit relays.

Current limit of acceleration will not permit the successive contactors to close unless the starting current has dropped to a predetermined value. If there is any trouble in starting, this often causes injury to the motor or starting coils, because the starter may remain on an intermediate point which permits a motor current in excess of that which it will stand for any appreciable time. The overload relays are not in circuit during this period, therefore there is no automatic protection.

Time limit acceleration control, however, will close the motor to its full run-

ning position irrespective of the current, and if any trouble is experienced in starting, the motor will be immediately tripped from the line on reaching this position. Time limit control, therefore, is preferable as starting equipment for motors used in this service.

Automatic controllers employing the use of relays are a source of considerable annoyance and upkeep cost, if any dust is allowed to accumulate on the relay plungers and contact parts. The most satisfactory controllers are those which are housed so as to prevent dust reaching such parts. The controller, therefore, should be properly enclosed for protection against dust. Various types of so-called dustproof cabinets are often used for this purpose, but for maximum reliability and minimum upkeep cost, control parts should be totally oil immersed.

With the exception of the screen, the feeder to the screen and the loading boom hoists, the tippie and preparation plant equipment operate at constant speed. For the satisfactory operation of screens and feeders, one speed point 10 percent above and one 10 percent below normal is desirable. A 50 percent speed point permits idling the equipment during periods when no coal is running. The boom hoists require equipment for intermediate hoist duty operation.

For variable speed with direct current application, the motor would be of the two speed type having its full field, full armature voltage speed at approximately 50 percent of the normal screen speed. The proper speeds for best screening results can then be obtained by weakening the shunt field.

For the constant speed equipment, shunt wound motors are usually satisfactory, except in cases of extreme starting torque requirements when it may become necessary to add a series field. The starting equipment for this type would consist of automatic control equipments with accelerating points on armature resistance.

For the boom hoist a series wound motor will prove satisfactory, and a magnetic type reversing switch with the resistance is required.

Practically all of the late installations of tipples are equipped with alternating current motor drives to conform with the characteristics of the power source. The standard squirrel cage type motors are satisfactory except where high starting torque is required. For this service the recent development of the double

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deck squirrel cage type motor will make a more satisfactory installation than the wound rotor type, which has always been objectionable for tippie work. The controls for the standard squirrel cage motors would be compensator type starters with contactors and for the double deck motors magnetic direct across the line starters can be used.

The conventional wound rotor type motor which is so often used for variable speed duty has never proven entirely satisfactory for the feeder and screen drive as it is impossible to maintain a fixed partial speed with the varying load conditions. Where, however, this type motor is installed, the contactor type control with resistance in the secondary would be used. Proper contactors should also be controlled by separate push buttons so as to obtain the speed variation required.

The brush shifting type motor having shunt characteristics is a more ideal drive for this class of service, and automatic variation in speed can be obtained by the use of a small motor to operate the brush shifting device.

For the boom hoist, higher resistance squirrel cage motors are satisfactory, and can be thrown directly across the line requiring the use of a simple magnetic reversing contactor. The reversing switches for the boom hoist should be such that will return to the off position immediately control circuit is broken. The control circuit is made by a push button so designed that it will open the control circuit when pressure is released. In this manner the hoist will operate in the desired direction only so long as the control button is pressed down.

As an additional safety measure control circuit switches should be placed near the motors or at convenient places so that any piece of equipment can be shut down quickly in case of trouble. If the proper method of cascading is used, the shutting down of any equipment in this manner will also shut down equipments which are feeding coal to it so that there can be no possibility of piling up of coal.

The arrangement of the central controlling station should be such that all control buttons are convenient to the operator and placed in a logical order to facilitate operation. The control for the car retarders can be brought to the same central point by means of bell cranks and ropes. Foot levers will be found the most convenient for operating these units.

In some cases it is also advisable to install a signal system by which the dock or picking boss can signal the tippie operator, giving instructions as to the desired operation of the units by code.

It is also often an aid in the operation of the tippie if the signal system between the bottom and the hoisting engineer at

shaft mines is extended, so that the tippie operator can follow the operation of the hoist and give any signals to the hoisting engineer that are necessary.

#### A SYSTEM FOR REGULATING HOISTING

In the case of one skip operation an automatic signal system has been designed. In order to properly coordinate the operation of the bottom dump station with that of the hoist to secure maximum hoisting speed, signals are given and certain gates are operated by the hoist control devices.

To thoroughly explain this feature, a description of the method of handling coal at the dump station is necessary. The coal is dumped by means of an air-operated rotary dump directly into weigh pans. The weigh pans are manually operated and discharge the coal through a chute to the skips. At the end of this chute there is a safety gate which is open only when the skip is at the bottom. These gates are operated by a crank shaft which revolves 180 degrees in opening or closing. To this crank shaft a motor is connected through a train of gears. On the second reduction gear shaft there is a magnetic clutch for each gate.

There are three lights in front of the operator on the dump floor to show respectively when the skip is in the shaft clear of the safety gate, when the safety gate is opening or closing, and when the skip is landed and the gate is in the proper position for loading.

When the descending skip has just passed the lip of the loading or safety gate, a contact on the hoist traveling nut limit switch releases the gate brake and sets the clutch to rotate the gate to open. When the gate is open a cam switch on the crank shaft resets the brake and releases the clutch. This operation requires about four-fifths of a second.

The dump operator opens the weigh pan with the signal that the safety gate is opening. The weigh pan, in opening, energizes a time relay after which an interval of eight seconds gives direct to the hoisting engineer the signal to hoist.

Similar operations control the closing of the safety gate. The operations are repeated for both skips so that the hoist works on a set schedule and delays are reduced to practically nothing.

#### LOCOMOTIVE CONTROL

There has been considerable discussion of late in regard to the proper method of controlling mine locomotives, used for haulage and gathering. There are two types now being installed by the different manufacturers. One, a drum type controller so arranged that the motors may be started either in series or in parallel. The other, known as a series parallel control, in which the motors are started first in series and then the con-

nection changed to parallel operation after the full armature voltage point has been reached in a series position.

Theoretically, the latter type should work out the more satisfactorily owing to the fact that it allows the motors to start with a minimum resistance and maximum torque. In actual operation, however, it appears to be a disadvantage for when starting a heavy load, if one set of drivers slip the torque on the other set becomes zero and the locomotive loses practically all of its traction. In the operation of locomotives of this type, it is general practice for the motorman to either set his brakes to hold the wheels while on the series points or to pass quickly over the series points to the parallel position. Either of these methods is detrimental to the equipment and will materially increase the power consumption.

It is believed, therefore, that the control should be arranged to start either in series or in parallel.

For locomotives under 10 tons, the controller should be of the drum cylinder type, with a master blowout coil and an external solenoid switch to eliminate heavy arcing with the controller in breaking the circuit.

Locomotives of 10 tons and over, require input currents that are too high to be handled economically by a drum or cylinder type controller. To eliminate the necessity of breaking this current by segments and contact fingers, a contactor type of control is advisable. This control should consist of a master controller arranged for reversing, and so arranged that the contactors can be operated to provide motor operation with either series or parallel connection.

The application of dynamic braking to locomotives is very desirable. The present practice of reversing the motor operation for braking as exists in a great number of mines, means high locomotive maintenance and increased power consumption. The dynamic braking feature would give an effectual means of bringing the locomotive to a stop without the use of brakes and the reversing of motors would no longer be considered necessary by motormen.

#### FAN CONTROL

The types of electric drives used in connection with mine ventilating fans vary with the ventilating conditions and requirements as determined for an individual case, and to insure that the fan may be operated for the greatest safety and economy.

Where there is no attendant at the fan, controls should be automatic and should conform in detail with all requirements for starting and putting on the line with safety, the particular type of motor used. By the use of such automatic features, (Continued on page 223)



## MODERN TENDENCIES IN MINE HOISTING

*A Frequent Question Asked By The Operator Is "Where Is The Dividing Line Between The Direct-Current Motor With Ward Leonard Control, And The Induction Motor With Rheostatic Control?"—Mr. Stone Discusses This Question And Gives His Conclusions, Emphasizing The Importance Of Drum Shapes And Drive Systems*

THE electrification of mine hoists has so many important phases and variations that it is a little difficult to know just where to begin a general discussion of the subject.

In considering the various conditions under which hoisting is to be accomplished and the various types of hoists used, we have, in part, the following conditions to meet—shallow shafts and deep shafts; and long and short inclines on which the product may be either hoisted or lowered, depending on local conditions.

Hoists of all descriptions may be balanced or unbalanced. They may hoist from a single level or from many different levels. They may hoist skips loaded with ore, or they may hoist the mine cars filled with ore, and there may be one or more cars per cage.

The cages may be of the platform type from which the car or cars are pushed off the cage, usually by the oncoming car, or they may be of the self-dumping type where the car never leaves the cage but is dumped and returned immediately to the mine.

The running speed of the hoist may vary from a speed as high as approximately a mile per minute to a low speed such as three or four hundred feet per minute. The drums also vary greatly, and we find cylindrical drums, conical drums, and cylindro-conical drums. In multiple level hoisting, we have clutched drums. This list might be further augmented by adding reel hoists using flat rope, Koppe discs, and the Whiting system of pulley arrangements. Fortunately, however, these latter systems have very little application in this country, and engineers seldom recommend their use.

When we consider the system of drive, selection is narrowed down to a very few more or less standardized systems. We have either the induction motor with its collector ring rotor, across which controlling resistance is connected; or we have a direct-current motor across a constant potential circuit with the speed controlled by resistance in series with the armature circuit; or we have the direct-current motor controlled by voltage control from a motor-generator, with or without a flywheel.

The question which is most frequently asked in regard to the electrical part is

By F. L. STONE\*

with what size of equipment shall the variable voltage of Ward Leonard control system be used, or, with what size shall the induction motor be used. In other words, where is the dividing line between the direct-current motor with Ward Leonard control and the induction motor with rheostatic control? The



F. L. Stone

size of the equipment has absolutely nothing to do with the proper selection of the system. It is purely a question of dollars and cents. For some hoisting cycles the Ward Leonard control is so much more efficient that it would be very uneconomical to install an induction motor. Occasionally, hoisting cycles are met with where it is almost a physical impossibility to perform the work with an induction motor because of its inability to regenerate current at sub-synchronous speeds and therefore exert braking effort when slowing down.

We will drop one possible application referred to above—namely, the constant potential rheostatic control, direct-current motor—as its application is very limited for the following reasons: The motor must be run from the motor-generator which feeds the trolley circuit. This set in turn receives its power from a transmission line, and, if the hoist be of any size, it would pay the operator well to run his alternating-current lines directly to his hoist rather than go

through the cumbersome and expensive process of a motor-generator set. If a direct-current hoist motor is attached to the trolley line it means that the direct-current transmission system, which ordinarily is taxed to its limit, must be capable of taking this additional load. It means, further, that the motor-generator must be just this much larger in order to be ready to take the hoist load when called upon, all of which is obviated if the hoist is driven from an alternating-current motor.

It is obviously impossible for me to discuss separately all the conditions which surround hoisting problems. I shall, therefore, endeavor to pick out a few special cases and discuss the various methods of drive which it is possible to apply.

Let us first assume the case of the coal mine shaft in which are installed self-dumping cages. The duty cycle imposed by the operators reads as follows:

Total hoist from sump to dump .....	500 ft.
Weight of cage .....	13,000 lbs.
Weight of car .....	3,500 lbs.
Weight of coal .....	8,000 lbs.
Tonnage required during a working day of 8 hours...	5,000 tons
Rest period .....	3 sec.
Diameter of rope .....	1½ in.
Power rate is such that demand charge is based on five-minute integrated peak and a sliding scale of kilowatt hours consumption.	
Average rate, including demand and kilowatt hours, in similar mines amounts to approximately 1.5 cents per kilowatt hour.	

We will pass over the actual calculation of the duty cycles, as this feature of hoisting has been discussed in great detail by the writer and many others in the past few years. Since an output of 5,000 tons per day is required, it is good engineering to design the hoist capable of operating at a rate that will produce this tonnage in seven hours. The reason for this is, of course, obvious to all operators, namely, that there invariably is a delay in hoisting due to conditions in other parts of the mine, such as a derailed car, trouble in the tippie, and various other conditions which restrict the output. If the rate of the hoist is determined as being such that it will produce the desired tonnage in seven hours, this is an ample margin of safety.

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In order to secure 5,000 tons in seven hours, an approximate output of 714 tons per hour, or 178 trips per hour, will be required. For the sake of simplicity, we will therefore assume that this hoist must make 180 trips per hour, or three trips per minute. Since the rest period necessary will be three seconds, we have seventeen seconds total running time. This seventeen seconds will probably be divided into five seconds for acceleration, seven full-speed running, and five seconds for retarding.

In order to show what can be done by proper shaping of the drums and the selection of the proper system of drive, we will first show the results obtained by using a cylindrical drum. Figure 1 shows this very clearly. A heavy line indicates the output of the hoist motor exclusive of the armature acceleration and retardation, while the dotted line shows the input from the line, using an induction motor drive. The area under the dotted line shows a power consumption of 7.9 kilowatt hours per trip, and such a cycle would require approximately a 3,000 horsepower motor. Since we are to make 1,250 trips per day for approximately 300 days per year, this hoist will consume 2,970,000 kilowatt hours.

Should a direct-current motor be used to drive the winding engine and a source of power for this motor be a motor generator with flywheel for equalization and using Ward Leonard control, the approximate input from the line would then be shown in the dash-dot line, Figure 1, and the power consumption per trip would be reduced to 3.6 kilowatt hours; or, for a year of 300 days, 1,350,000 kilowatt hours, or a saving in kilowatt hours of 1,620,000 per year. This, at 1½ cents per kilowatt hour, would amount to an annual saving of \$24,300.

The cost of a 3,000-horsepower induction motor with its control would be in the vicinity of \$40,000. If the direct-current system be selected, the horsepower of the motor will be very materially reduced, due very largely to the reduction in the armature acceleration, since the direct-current motor should be direct connected to the drum and therefore operate at very slow speed. The rating of the direct-current motor would be in the vicinity of 1,800 horsepower. The entire direct-current equipment, including motor-generator, control, and hoist motor, would cost approximately \$72,000, or about \$32,000 more than the induction motor drive. The saving in kilowatt hours, however, in the direct-current system would wipe out the difference in first cost in less than one and one-half years' operation.

We will now take up the question of applying to this equipment a cylindro-conical drum, and we will select a drum with a minimum diameter of 7 feet and a large diameter of 11 feet, and with

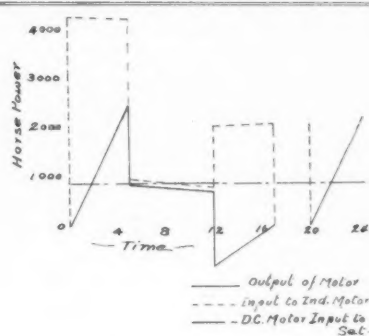


Fig. 1

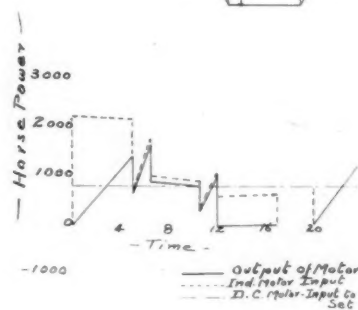
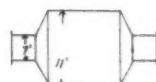


Fig. 2

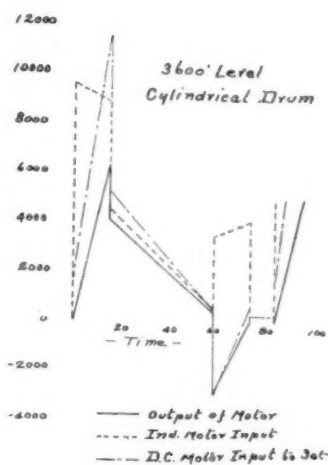


Fig. 3

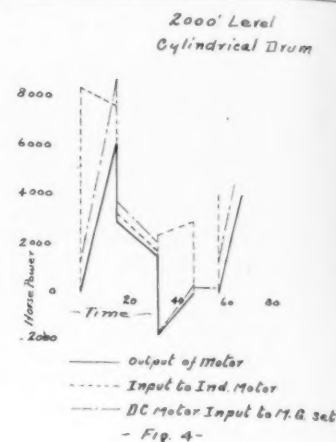


Fig. 4

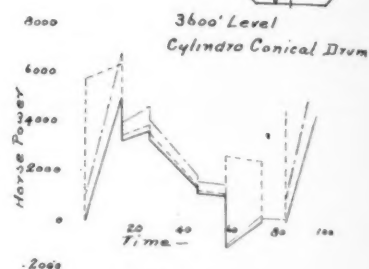


Fig. 5

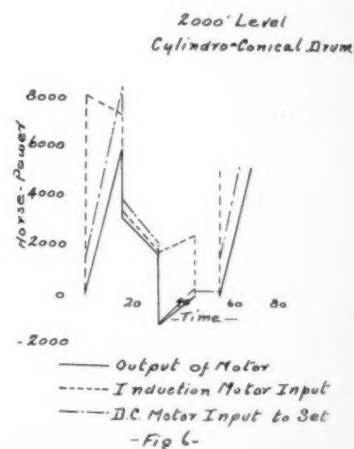
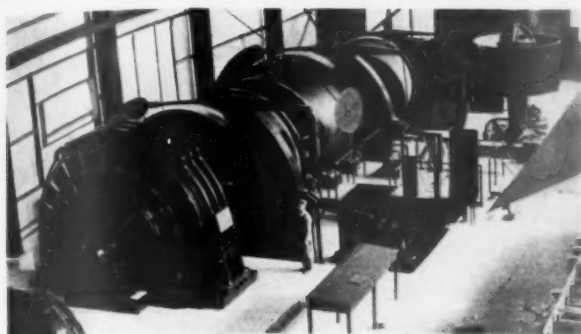


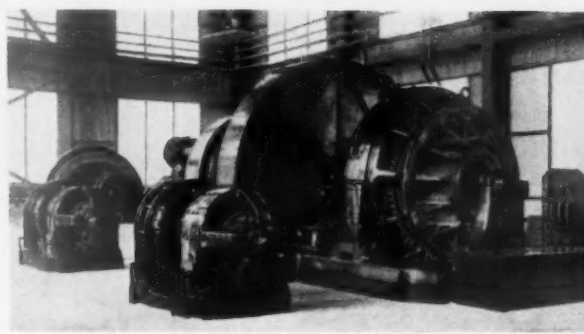
Fig. 6

two turns up the cone. We will retain the same time for acceleration, retardation, and constant speed running as in the case of the cylindrical drum. We will further design the drum so that the rotary acceleration of the drum ends just as the ascending rope reaches the foot of the cone. Under these conditions the drum will have 3.35 turns on the small diameter, two turns up the cone, and 10.7 turns on the large diameter. The

output of the motor is shown in the heavy line of Figure 2, while the input from the line, if an induction motor be used, is shown in the dotted line; and in case a direct-current system of drive similar to that described with the cylindrical drum be used, the input will be shown in the dash-dot line. The kilowatt hours per trip, using the induction motor, are now reduced to 4.3, while the direct-current system produces



Ore Hoist, Porphyry Shaft Station, Inspiration Consolidated Copper Company, Inspiration, Ariz. Motor Rating MCF-22 Pole 2,150 HP-51 RPM., 650 Volts



Flywheel Motor Generator Set for Ore Hoist 1,600 KW DC Generator, 1,900 HP Induction Motor, 78,000-Pound Flywheel. Porphyry Shaft Station, Inspiration Consolidated Copper Co., Inspiration, Ariz.

a further reduction to 3.23. Calculating on the same basis as we did for the cylindrical drum, the total kilowatt-hour consumption for the year with the induction motor, which, incidentally, will now be rated approximately 1,500 horsepower, we have a total kilowatt hours of 1,612,500; while the direct-current system, which would require a 1,100 horsepower motor, would consume 1,211,250 kilowatt hours, or a saving of 401,250 kilowatt hours per year. These, at 1½ cents per kilowatt hour, show a saving of \$6,018. The induction motor installation would carry a first cost of approximately \$22,500, while the direct-current equipment would cost approximately \$49,500. Capitalizing the \$6,018 saving on the basis of 20 percent, it would indicate that the operator could afford to spend \$30,000 more for his direct-current equipment than for the induction motor.

From the above study, the indications point to the fact that a cylindrical drum has no place on such a cycle, especially if an induction motor is desired for driving the hoist. It would be possible, however, to use a direct-current equipment with the cylindrical drum without much sacrifice of power, but the size of the equipment required is so much greater than that required for the cylindro-conical drum that the cylindrical drum, I fear, would have little consideration.

Where the cylindro-conical drum is used on a cycle such as we are dealing with, the proper selection of the type of drive is perhaps not so clearly indicated. If the equipment is to be kept busy, then the savings referred to above will result in favor of the direct-current equipment. If, on the other hand, for some reason the hoisting is not as continuous as anticipated and the idle periods between trips much greater than anticipated, then the standby losses of the motor-generator will, in all probability, offset the saving credited to the direct-current drive, which of course is based on continuously operating the equipment.

The particular form of power contract may have a direct bearing on the selection. If instantaneous peaks are to be penalized, the operator has little or no alternative except to install some form of equalizing equipment. If, on the other hand, his power demand is based on maximum integrated peaks over a period of five to ten or fifteen minutes, then the induction motor should impose little or no hardship, provided, of course, the power company and its transmission is equipped to take the peaks called for by the induction motor.

In the case of a new development for a mine of this capacity, the writer feels it would be good judgment on the part of the management to purchase a winding engine of sufficient size and of the correct layout to meet the ultimate hoisting conditions and arranged to take the large direct-current equipment as soon as the production has reached a stage where it is advisable to install the same. During the development stages, which may run from two to three years, a comparatively small induction motor may be used, capable of producing, without any hardship on the power company, from a thousand to fifteen hundred tons daily—this motor, of course, being geared to the hoist. When it is ultimately decided to install the large set, the induction motor can still be used for night work and idle periods, thereby obviating the necessity of having to run the large motor-generator set and flywheel for infrequent hoists. When the hoist is running at high speeds, the induction motor would, of course, be uncoupled from the mechanical parts by either a clutch coupling or some similar arrangement. These standby motors for night service are very common in many mines.

We will now consider a hoist for a mine of a totally different nature, and the equipment will have to meet the following duty:

#### Vertical Shaft—

Maximum depth of hoist, feet....	3,600
Skip, self-dumping type—weight, pounds.....	10,000
Weight of ore, pounds.....	16,000
Rope diameter, inches.....	2
Weight of rope per foot, pounds..	6.3
Rope speed, feet per minute....	4,000
Hoist to be of the double-drum type with at least one drum clutched.	
Delay between trips, seconds....	10

The above set of conditions are very frequently met with in metal mining operations, there being several hoists in South Africa, the duty of which corresponds very closely to the above.

In the solution of this problem, we will show a cycle, first using a cylindro-conical drum and, second, using a cylindrical drum.

The idea of the cylindro-conical drum in this case is, insofar as possible, to counteract the weight of the rope, which in these great depths becomes very excessive, and in this case, as in many others, will, when hoisting from the bottom, create an overhauling load even though the up-going cage carries its full allotment of ore. This hoist will be called upon to hoist for some considerable periods at various levels below a thousand feet.

In investigating this condition of hoisting, we will first consider a hoist having double cylindrical drums, and second a hoist with double cylindro-conical drums. In each case we will show the input from the line using a straight induction motor drive for the hoist and a direct-current motor drive with a motor-generator set but without any flywheel equalization. The driving motor of the set may be either an induction motor or a synchronous motor, or flywheel equalization might be resorted to provided it is indicated by the power rate.

Figure 3 shows the duty cycles in using the cylindrical type of drum and hoisting from the 3,600-foot level. The heavy line indicates the output of the hoist motor, while the dotted line indi-



cates the input to the induction motor when driving the hoist, and the dot-dash line indicates the input to the motor of the motor-generator set when a direct-current hoist motor is used.

When hoisting from 3,600 feet, the kilowatt-hours consumed by the induction motor will be approximately 62.4; while the input, using the direct-current system, will be but 42.7 kilowatt hours per trip. The demand on the line with the direct-current motor will be approximately 11,500 horsepower, while with the induction motor drive the demand drops to 9,600 horsepower. The duty cycles indicate that if a direct-current motor be used it will be rated approximately 4,800 horsepower, while if an induction motor be used, it will have to be rated approximately 5,200 horsepower.

Figure 4 shows the same condition of hoisting from the 2,000-foot level, using cylindrical drums. Here we find even greater percentage difference in the kilowatt hour consumption of the two systems, the direct-current system requiring 24.5 kilowatt hours per trip while the induction motor hoist requires 41.6 kilowatt hours per trip. The maximum peaks in both cases are reduced somewhat due to the reduction in weight of active rope.

For the benefit of those not familiar with reading duty cycles, I would state that the area shown under the dotted line during retardation of the induction motor means that the motor under these conditions has to be plugged or reversed and takes power from the line to stop. This, in part, explains the quite noticeable difference in the efficiencies of the two systems.

We will now consider a cylindro-conical drum. This drum will have a small diameter of 10 feet, a cone leading up to a diameter of 18 feet, and on the cone will be coiled 1,000 feet of rope. The large diameter will be of sufficient length to hold the remaining 2,600 feet of rope in two layers.

Figure 5 shows the duty cycles obtained under these conditions of operation when hoisting from the 3,600-ft. level. The same legend is used as in the previous cycles, and we have the following results:

The direct-current system will require 38 kilowatt hours per trip, while the induction motor drive will require 46 kilowatt hours per trip. The peaks on both systems are reduced quite materially, the direct-current peak coming down to about 6,900 horsepower, while the induction motor peak has dropped to 6,400 horsepower.

The size of motor required to operate this drum is considerably less than that required for the cylindrical drum, the direct-current system requiring about 3,750 horsepower, while the induction

motor will require about 4,500 horsepower.

Figure 6 shows the operation of this cylindro-conical drum from the 2,000-foot level. Here we find the input to the direct-current system is 24.3 kilowatt hours per trip and the input to the alternating current system is 39 kilowatt hours per trip. The peak demands, however, have increased slightly. This is due to the fact that we are now operating this cylindro-conical drum on the flat portion and deriving no benefit from the cone. The input peak to the direct-current system will be approximately 9,000 horsepower, while to the alternating current system approximately 8,200 horsepower.

The question as to whether direct-current Ward Leonard control system should be used or the cheaper induction motor system is, in this case, determined largely by the preference of the operator. The first cost of the induction motor equipment will be approximately one-third of that of the Ward Leonard equipment. On the other hand, the power consumed by the Ward Leonard installation will be considerably less than that consumed by the induction motor. The control of the Ward Leonard system is considerably more flexible than the control of the induction motor, and in many camps the Ward Leonard equipment is considered very much safer. The writer has been informed that with the Ward Leonard equipments in South Africa, a considerably higher hoisting rate is permitted when hoisting men than is permitted when an induction motor is used.

It may be in order to describe in a little more detail the control used on the two outstanding types of hoist equipment.

#### THE INDUCTION MOTOR

This machine is equipped with a wound rotor with collector rings across which is connected a variable resistance, the quantity of which is always under the control of the operator. The primary current is fed into the stator through two sets of triple-pole air-break contactors, these contactors operating directly in the supply circuit. One set of contactors, when closed, produces clockwise rotation; and the second set, when closed, produces counter-clockwise rotation. These contactors are mechanically and electrically interlocked so that it is impossible to close one set unless the other set are open and the arc of rupture broken. These air-break contactors have an exceedingly long life of tips, which is the only part subject to wear.

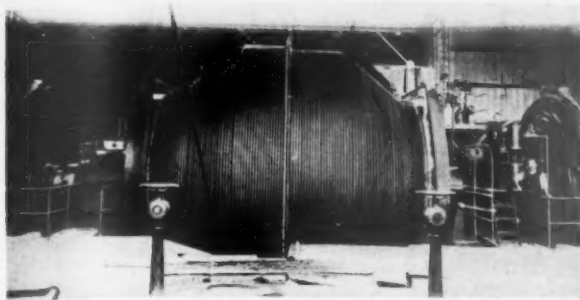
The secondary resistance may be either of the liquid type or it may be of the metallic type. If the liquid rheostat is used, this usually consists of a large wrought iron tank with an internal

electrode chamber. In this chamber are suspended electrodes which in turn are connected to the collector rings. In the bottom part of the rheostat proper is the electrolyte, usually a weak solution of sodium carbonate. This electrolyte is circulated by means of a small centrifugal pump from the bottom of the tank up into the electrode chamber and from there returning to the bottom of the chamber again. The pump runs continuously. The front of the electrode chamber is equipped with a wiper which can be closed either fully or partially at the will of the operator.

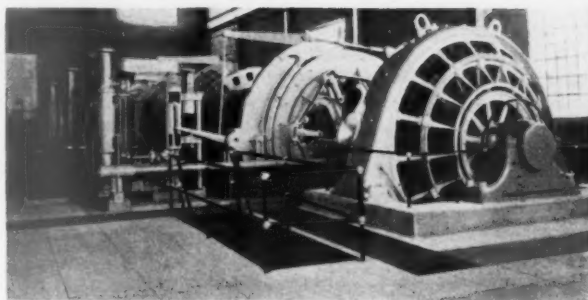
When the operator desires to start his hoist, he pulls his lever in the correct position, either forward or reverse, which in turn raises the wiper and the electrode chamber begins to fill. The same motion of the lever operates a small controller which closes the correct primary contactor. The hoist reaches its full running speed as soon as the electrode chamber is filled. There will always be a certain amount of resistance in the chamber, even though full, and it is not deemed advisable to use any short-circuiting device to cut this running resistance out. The reason for this is that the resistance of the electrolyte in practical operation varies somewhat from day to day and should a short-circuiting device be installed and the resistance in the chamber get a little too high, the effect of short-circuiting it by means of external contactors would be a very heavy surge on the line and very heavy internal stresses in the motor. Since this resistance in a well designed rheostat is so low that it should not at full load produce a slip of more than 3 percent, it is considered better practice to leave this resistance in the circuit rather than attempt to short-circuit it with contactors.

The maximum rate of acceleration in a liquid rheostat is determined by the time required to fill the tank. There are no current limiting devices used with liquid rheostat control, and experience has indicated that these devices are not necessary where the time element is so definitely fixed. The acceleration with the liquid rheostat is very smooth, there being no definite points but a gradual reduction of resistance from maximum to minimum. This particular feature in the liquid rheostat has, I feel, been very much misunderstood, operators claiming that with a liquid rheostat, peaks are not so severe on the line as with contactor acceleration. It must not be forgotten that it requires a certain amount of energy to accelerate a given mass in a given time. Therefore, irrespective of the kind of control, the peaks of acceleration will be virtually the same whether liquid rheostat be used or contactor control, the only difference being the small saw-





Four Thousand HP Direct Current Hoist. South Rand Shaft, Crown Mines Limited, South Africa



Type MPC-16-1,650 HP 80-525 Volt DC Motor Driving First Motion Hoist. Ironton Mine of McKinney Steel Company, Bessemer, Mich.

tooth effect obtained when contactors close. The liquid rheostat will produce almost a straight line during the acceleration period, while the contactors will produce a somewhat jagged line, the average of which will be the same as that produced by the liquid rheostat.

#### CONTACTOR CONTROL

Where the acceleration is to be controlled by successively closing contactors, these are connected across the metallic resistance in balanced steps, there being as many, on large hoists, as eight steps. They close in sequence and are controlled by current limit—that is to say, no contactor is allowed to close until the current value has fallen to a predetermined amount. This is accomplished by means of current limiting relays which are interlocked through the control circuit. As in the case of the liquid rheostat, the operator, from his master controller, can control the speed by the number of contactors he permits to close.

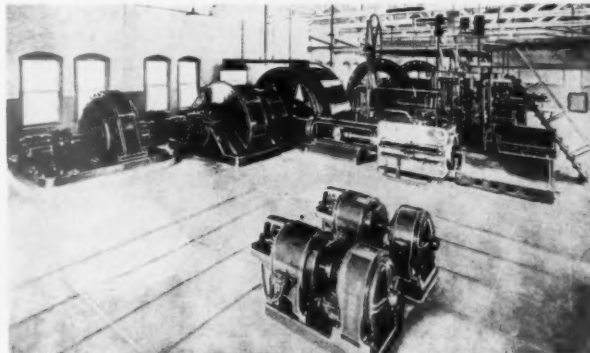
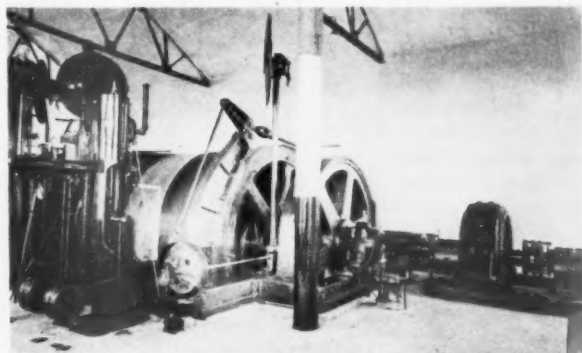
#### DIRECT-CURRENT WARD LEONARD CONTROL SYSTEM

Here we have, as previously stated, a direct-current motor driven from its own motor-generator set. This set may in turn be driven by a synchronous motor or an induction motor, and it may or may not be arranged for flywheel

equalization. If flywheel equalization is required, it is of course necessary to use an induction motor as the driving element of the set. The motor field is continually excited and the generator field is varied both in direction and in intensity by a controller and rheostat in series with the field. An exciter on the motor-generator usually supplies the excitation for all machines. This exciter is held at practically constant potential. The speed of the hoist motor is, for all practical purposes, directly proportional to the position of the controller handle irrespective of loads. This feature is not found in the induction motor hoist where the speed varies considerably with the load for a given amount of resistance in the secondary circuit. In other words, an induction motor with a resistance in its rotor circuit has somewhat the same speed load curve as a direct-current series motor. This feature of the Ward Leonard equipment lends itself admirably to automatic hoisting, and were it not for this feature, I fear the problem of automatic hoisting at anything but the very slowest speeds would still be unsolved. With the Ward Leonard equipment, however, it has been solved, and the most notable example is that of the two hoists installed at the In-

spiration Consolidated Copper Company, which have been operating fully automatic for many years. The hoists are started by closing a single switch and continue hoisting independent of any operator throughout the entire shift. Loading of the skips is, of course, automatic also.

It will be seen from the above that the Ward Leonard control lends itself much better to the application of safety devices which today are receiving such serious attention. I do not mean to infer from the above that an induction motor hoist is not absolutely safe, or that safety devices cannot be applied to it; they can, but not as easily as to the Ward Leonard equipment. For instance, in case the operator of a Ward Leonard equipment allows the cage to run beyond the point at which he should begin slowing down, a cam device comes into play which will turn the controller to the off position, thereby reducing the speed to the proper point for entering the dump; and, if the operator has not regained control of the hoist, the cam device will put the controller in the completely off position and thereby prevent an overwind. This method cannot safely be employed by an induction motor hoist, as the speed, as before described, is not proportional necessarily



Left Picture—Type 1-20-875 HP-360 RPM.-2,200 Volt Induction Motor Geared to Mine Hoist. Oliver Iron and Mining Company, Ironwood, Mich. Right Picture, Left Background—Type 1-20-1,800-360-2,200 Volt-3 Phase-60 Cycles. Form M Motor Connected Through Dray Links to Converted Steam Hoist. Right Background—Two Type ATI-9-565-KV-A-700 HP-80-2,200 Volt-3 Phase-60 Cycle Synchronous Motors Direct Connected to Air Compressors. Foreground—Two Exciters Sets Consisting of 1-6-75-1,200-2,200 Volt-60 Cycle-3 Phase Form K motors and DLC-4-50-1,200-125 Volt Generators. Tennessee Coal, Iron and Railroad Co.

to the position of the controller. For instance, if the load were light or empty cages were being moved, insertion of resistance would have little effect on reducing the speed.

#### OVERWINDING ANL SAFETY DEVICES

These devices as a rule are manufactured either by the builder of the mechanical parts of the hoist or by some independent manufacturer. Satisfactory overwind devices should embody the following features:

1. Prevent the hoist engineer from starting in the wrong direction when at or near the limit of travel.
2. Prevent the engineer from running at too high a speed without warning as to the proper speed limit.
3. Prevent the engineer from over-running the point at which he should begin retarding in order that the cage or skip may be stopped at its proper place.
4. Prevent the engineer from over-running the limit of travel or mistaking the limit marks on the indicator or drum.
5. Prevent the engineer from over-speeding and possibly losing control of the hoist when lowering on the brakes.
6. Prevent the engineer from releasing the brake on the drum unless the clutch is set, or releasing the clutch without the brake being set.
7. Under proper conditions to set the brakes immediately upon the failure of power.
8. Prevent over-speeding of the drum from any cause whatsoever.
9. Prevent engineer from hoisting at faster than the prescribed rate when handling men.
10. Prevent engineer from hoisting men above the man landing.
11. Prevent engineer from lowering men below a safe point in the shaft, possibly into the sump.
12. Overwind devices should be arranged so that gradual application of the brake will follow the emergency tripping if the hoist is at high speed, and a rapid application of the brake if hoist is at low speed, thus saving severe shocks to the equipment which would otherwise be incurred.

There are, of course, many modifications of these requirements, but if all the above conditions are met in the combination of safety devices supplied by the hoist builder and the electrical manufacturer, the majority of other contingencies will take care of themselves.

In recent years the system of hoisting coal in large skips has been steadily growing more popular. This system has the decided advantage of reducing the rope speed very materially, and it usually reduces the horsepower capacity of the electrical equipment. Very thorough investigation has been made regarding the breakage of coal when hoisting by this

method, and it has been found that if the skip be properly designed, the breakage is practically negligible. This was very well illustrated in a paper given by Allen and Garcia, before the American Institute of Mining and Metallurgical Engineers in February, 1921. This paper shows the savings resulting from the use of skip hoists as compared with cage hoists.

In the foregoing discussion, the writer has endeavored to show as simply as possible a few of the problems which confront the operator when he decides to install a modern hoist. The solution of these problems is not at all difficult, provided all the information surrounding the equipment is known with a fair degree of certainty.

One point should be borne in mind, and that is that on fast, short cycles such as are encountered in coal mines, any increase in speed beyond that which is absolutely necessary increases the size of the equipment at an amazing rate. This is due to the fact that on these short, fast cycles the rating of the equipment is usually determined by the energy required to accelerate the mass rather than the running load, and this acceleration increases with the square of the speed.

Too much thought can not be given to the proper selection of the shape of drum and the system of drive.

Awards totaling \$39,531 were paid to 3,244 employees of the General Electric Company during 1924 for suggestions which increased the efficiency of the company's operations. The suggestions ranged from those covering safety devices for the protection of workers to ideas on improved methods of manufacturing electrical apparatus, and the awards ranged from \$1 to \$1,000.

In 1923, \$22,988 was distributed to 1,752 employees and the highest award was \$500. Of all suggestions offered, 21.7 percent were accepted. In 1924, the percentage of acceptances was 36, showing a large increase in the interest and awards in the suggestion system over the preceding year.

Briefly the operation of the plan follows:

Suggestions are sent to a special committee in each works. This committee investigates the suggestion, passes upon its merit, and either makes an award or explains why the suggestion cannot be effectively adopted. In most cases the award is made within a few weeks after the suggestion is received but, where it is necessary to put the suggestion into practice in order to determine its value, a longer time must elapse.

The awards may, at the option of the recipient, be paid in 8 percent G-E Employees Securities Corporation bonds.

## ELECTRICAL SAFETY CODE

THE last edition of the National Electrical Safety Code (Handbook 3 of the Bureau of Standards) was completed in 1920 and issued in 1921. In the following year it was approved by the American Engineering Standards Committee as an American standard. A revision, preparatory to issuing a new edition, has been under way for the past two years. This work is being carried out by two sectional committees; one dealing with interior work and grounding, and the other with line construction and operating rules.

The latter committee has practically completed its work, and at a meeting at the Bureau on March 5 and 6 final decisions were reached covering requirements which will be contained in Parts 2 and 4 of the next edition of the Code. Important changes in line-construction rules agreed upon, follow: Revision of the loading specifications upon which the strength requirements of poles, towers, and conductors are based; changes in the map which defines the three loading districts of the country; establishment of a table covering working stresses for steel used in supporting structures; changes in factors of safety for treated and untreated wood poles; changes which will bring about agreement of the Code and the specifications of the American Railway Association; revision of certain clearance requirements; establishment of a new table of flashover values for line insulators; insertion of a rule forbidding the use of the ground as a return circuit in urban districts, and a recommendation against such practice in rural districts; revision of rule covering joint use of poles by supply and signal circuits; and the preparation of special rules governing the construction of radio antennas.

## UTAH CHAPTER ELECTS OFFICERS

THE Utah Chapter of the American Mining Congress, at its annual meeting March 23, elected the following directors to serve for three years:

L. S. Cates, O. N. Friendly, Thomas F. Kearns, Samuel K. Kellock, J. William Knight, Imer Pett, L. F. Rains.

The holdover directors are: Ernest Bamberger, Fred Cowans, W. Mont Ferry, H. M. Hartmann, G. W. Lambourne, C. E. Loose, Duncan MacVichie, D. D. Muir, Jr., E. L. Newhouse, Jr., E. J. Raddatz, V. S. Rood, J. B. Whitehill.

At the directors' meeting following the annual meeting, officers for the ensuing year were elected as follows: E. J. Raddatz, Governor; G. W. Lambourne, First Vice Governor; Imer Pett, Second Vice Governor; H. M. Hartmann, Third Vice Governor; A. G. Mackenzie, Secretary and Treasurer.

## CONTROL OF MINE EQUIPMENT

(Continued from page 216)

interruption in ventilation can be reduced to a minimum as in case of power failure, the fan will return on the line immediately on resumption of power service.

When variable speed features are desirable, control for the various outputs required may be manually operated as it is not often sudden changes in air volumes are necessary.

As in the case of most equipment which is operated without an attendant or very frequent inspection, it is desirable to embody in the control equipment, safety features for protecting the motor coils and the bearings against overheating, and the equipment against overspeeding. There should also be provided a signal system so that proper warning can be given in case the motor is tripped out by the operation of any of the safety devices.

### CONVERTER STATION CONTROL

Where the source of power for the mine operation provides alternating current, converter substations located at the various load centers at the face are now most universally provided. These substations may be placed either above ground with direct current feeders entering the mine through bore holes or the converting units may be placed in the mine with the alternating current feeder entering through bore holes. Semi-automatic control—that is, the equipment is started by push button and further operation is automatic, is desirable and will usually prove their worth in eliminating station attendants for either the surface or underground substation installations.

The connection to the direct current transmission system is made by the direct current circuit breaker of the automatic reclosing type which opens on overload and recloses when the resistance of the circuit has risen to a predetermined value. Where two or more units are placed in one substation, provisions must also be made for paralleling. When two or more units are used in the same mine, it is usually advisable to provide for the opening of the breaker on reversal of current.

The necessity of providing load-limiting features can only be determined by a study of local conditions. However, it is seldom that such protection has a material value in coal mining installations.

Automatic safety features should be provided to temporarily disconnect the driving motor from the line in case of low voltage, complete failure of power, overheating of windings, loss of motor field, loss of generator field; phase failure or phase reversal. The set should immediately restart automatically as soon as the cause or causes for such a shut down are removed.

In case of more serious trouble which cannot be automatically cleared, the set should be disconnected from the line and remain locked out. The machine should be locked out after failure of set to start properly and go on to the line, heavy overload on the alternating current end which would be indicative of failure of direct current circuit breaker, reversed polarity of generator; overspeeding, reversal of current.

Substations have been installed without automatic starting features and not such extensive protective devices as mentioned above. This may be permissible

under certain conditions, but it is always advisable to supply the automatic reclosing circuit breaker for the generator with overload and reversed current protection and overload and low voltage for the alternating current motor and winding and bearing thermostats for both units. This will give the unit protection which is ordinarily sufficient for a manually started equipment. Where such control is used, however, there should be a man conveniently near to act as station attendant in connection with his other duties.

## MINE DRAINAGE AND COST REDUCTION

*If Operators Will Standardize Their Drainage Equipment Requirements As To Capacities And Pressures, Shop Cost Can Be Reduced And Engineering Time And Expense Can Be Practically Eliminated*

By HENRY E. COLE\*

TO properly appreciate the advantages of standardization to the manufacturer or dealer, we should realize something of what it means to produce a new pump to meet a supposedly new demand.

The costs and future responsibility for a new machine is so great that the manufacturer usually tries to satisfy himself that the demand is great enough to justify this expense.

As soon as the decision is reached to go ahead, the designing engineers must first make a careful study of the conditions to be met—the character of the liquids to be handled, considering particularly their corrosive and abrasive character; need for accessibility and renewals and determine if unit is to be portable, semiportable or stationary; in fact, all features of the operating requirements.

Then, too, the designing engineers must plan for accessibility—renewal of parts and adjustments when in service, as well as for minimum cost and maximum efficiency through the shops.

A full line of drawings, tracings and details must be made, the provision for filing same for frequent inspection and with reasonable fire protection.

Complete patterns and core boxes must be made and storage space for them must be provided.

In most cases jigs and templates must be made to facilitate production and guarantee interchangeability of parts. In some cases special tools must be designed and used exclusively for the new machine. Filing and storage space must be provided for all of this producing equipment.

Additional space must be provided for the storage of material in production and spare parts for service, and lastly

the manufacturer is under a moral obligation to the purchaser to stand ready to furnish quickly any spare parts while machine is in active production and also be prepared to furnish accurate repair parts for all units shipped as long as they shall remain in service. In order to acquaint the consumer that the new machine is available, photos and cuts must be made, circulars and printed matter issued and additional space provided in catalogues.

If, therefore, the user of mine drainage pumps can standardize on his requirements as to capacities and pressures, we can readily see the following distinct advantages to the manufacturer or his representative.

Shop cost can be reduced to a minimum by concentration—by studying each operation, by machining corresponding parts for a number of units at the same time, and the same set up for the corresponding operation on all units. Each man can then become a specialist. Engineering time and expense is soon almost entirely eliminated. Office records, filing space, shop space, as well as special tools, jigs and templates, are kept at a minimum.

As a result of concentration on a relatively small number of sizes and styles a degree of mechanical efficiency can be obtained which would otherwise be impracticable.

By standardization of sizes it is a simple matter to carry complete units as well as spare parts in stock for immediate shipment where otherwise it would be a complicated task.

The manufacturing costs can, by standardization of sizes and types and consequent increased production, be very materially reduced, and since in the long run the consumer pays the bills, so by standardization the consumer gets the benefit. This feature should prove a real help toward lower production costs.

\* President, Harris Pump and Supply Company.



# ROCK DUSTING PRACTICE OF THE PITTSBURGH COAL COMPANY

*The Pittsburgh Coal Company Has Carried On Investigation Concerning The Advantages Of Rock Dusting Since 1916, With The Result That It Is Being Adopted As Rapidly As Possible By All Of Their Mines—This Article Outlines The Method Used In Applying Rock Dust, And the Advantages Thereby Derived*

By U. U. CARR\*

**A**S EARLY as 1916 the operating department of the Pittsburgh Coal Company began an investigation of rock dusting as a safety measure. During this period of investigation experiments with different types of dust barriers were carried out as well as different ways of applying rock dust to the roof and ribs—principally by hand. The efficient application of rock dust to the mine surfaces was the main endeavor and as a development in this direction a dusting machine was built.

This machine, mounted on a truck, consisted of a hopper from which the dust was fed by gravity to the discharge pipe of a blower driven by a 5-horsepower motor—not unlike some of the machines in use today. Followed the strenuous war-time period and further work along this line was given up for the time being. Such information as was available on rock dusting was rather vague at that time and no definite program was developed. Convinced, however, that rock dusting was of prime importance as a means of preventing coal dust from propagating the flame of an explosion, the question was again taken up for definite solution about one year ago.

It should be understood here that rock dusting is by no means considered, by this company, as a cure all for explosions. Rock dusting is being carried on, as will be explained later, purely as a precautionary measure and as such is considered cheaper, safer and more reliable than sprinkling or wetting the mine surfaces with water as had been the practice heretofore. Neither is it the intention of this article to discuss the merits or faults of rock dusting but rather to describe the methods used in practice by the Pittsburgh Coal Company.

Starting about one year ago with all the available information of the time numerous and exhaustive experiments and investigations were carried on by

the company's expert mining men, both independently and in cooperation with the United States Bureau of Mines. As a result of this work a dusting machine has been developed, and a definite program of rock dusting worked out which is being put into effect in all the mines of the company as rapidly as possible.

Preliminary to the work of dusting a mine, the entries are divided into zones. The zones are 5,000 feet in length and commencing at the pit mouth are designated by the letters of the alphabet. In each zone stations are measured off 500 feet apart. These stations are designated by the zone letter and a number corresponding to the location of the sta-

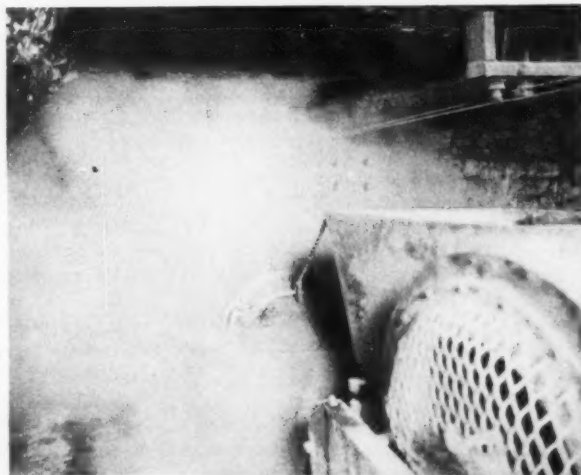
tion from the end of the zone nearest the pit mouth as A-3, C-4, etc. Each station is marked by a white enameled board about 8 inches square fastened to plugs in the rib and on which the station number is stenciled in black. These enameled boards may be easily cleaned by wiping with waste or cloth and the numerals made visible after rock dustings.

All dust samples for analysis are taken at station points. The sample is numbered and also marked for identification with the station number. A blue print of the mine workings on which the zoning is laid out, gives, at a glance, the exact point in the mine from which any sample is taken. Records of the dust samples taken at different times are also kept for each station, which will in time yield interesting information as to rate of coal

dust accumulation. Practically all of the coal dust in a mine is manufactured at the working face, later to be deposited along the entries by being dislodged or blown from the moving cars—some may be carried by the ventilating currents. The area nearest the working faces is also the most probable source of an explosion, so that efficacy in arresting flame depends more on the rock dust in that section than in any other part of the mine. Initial dusting operations are commenced in the zones farthest from the pit mouth. That is the butt entries and room necks are dusted first, then the haulage



U. U. Carr



Dusting Machines in Operation. Above, in the mine and, below, in the open air

\*General Manager, Diamond Machine Company.



roads to the main entries, and out the main entries toward the pit mouth.

Preparatory to rock dusting a section all loose material is shoveled up and the roadway thoroughly cleaned. Samples of dust are then taken at each station in the section, by brushing a clean streak or channel not less than 6 inches wide around the roof, sides and bottom of the entry. As a guide to measure the width of the channel the dust is brushed into a pan or scoop 6 inches wide. The sample thus obtained is sieved through a 10-mesh screen and the coarse particles are discarded. The containers used for carrying the sample hold  $\frac{1}{2}$ -pint, and this amount is collected at each station. If the brushings from a 6-inch channel yield more than  $\frac{1}{2}$ -pint, the dust is deposited on an oil cloth, thoroughly mixed, and enough taken to fill a container. Should a 6-inch channel yield less than  $\frac{1}{2}$ -pint, the channel is widened until the required amount is obtained.

Space is provided on the sample identification card, which is filled out and placed in the container to note the width of the channel and the cross section of the entry. This information gives a good idea as to whether the dust deposit is heavy or light.

#### SAMPLE IDENTIFICATION

Numerous samples taken in this manner have shown dust accumulations ranging from 5 ounces to  $1\frac{1}{4}$  pounds per lineal foot, the average is found to be about 1 pound. Further tests of coal dust samples indicate, that as an average, 25 percent of the sample will pass 200 mesh. In testing for incombustible content the "round" sample is used and no account is taken of moisture or the ash content of the coal dust. The half-pint sam-

ple is sieved through a 20-mesh screen and from the screenings a sample weighing 20 grams is taken for test. Incombustible content is determined by the well known volumeter method and, needless to say, all samples taken before rock dusting show a lower percentage of incombustible than that fixed by the company as a safe limit.

For rock dusting pulverized limestone is used all of which will pass through 100 mesh and 75 percent through a

SAMPLE IDENTIFICATION	
NAME	NUMBER
KIND OF SAMPLE	10
MATERIAL APPLIED	LBS. APPLIED
LOCATION	
WIDTH OF CHANNEL	CROSS SECTION
VOLUMETER READING	PER CENT INCOMBUSTIBLE
SAMPLER	
NOTE: SHOW WHETHER BEFORE OR AFTER DUSTING FOR "KIND OF SAMPLE"	

Card Used for Sample Identification

200-mesh screen. This dust is purchased in paper bags weighing 80 to 85 pounds each, at a cost of \$6.10 per ton delivered. The percentage of incombustible material in the resulting mixture as sampled after rock dusting is fixed at 65 percent as a minimum, a great percentage is desirable rather than objectionable. For the initial dusting of a section 3 pounds of rock dust are applied

per lineal foot of entry. Immediately after rock dust is applied to a zone, "round" samples of dust are again taken at each station, in the manner previously described, and tested by the volumeter method to determine the percentage of incombustible dust in the mixture. Tests of many samples taken immediately after the application of 3 pounds of rock dust per lineal foot show 76 percent to 80 percent incombustible. After dusting, samples are taken for test at each station at intervals of 30 days. As soon as the sampling indicates that combustible dust has reached the danger point—35 percent of the mixture, another coating of rock dust is put on. Nothing is left to chance—there is no specified time for re-dusting. Sampling alone determines when additional rock dust is required. How often re-dusting will be required depends on the mine conditions and the amount of dust applied so that no general rule is applicable. After sampling has been carried on for a longer period the records will no doubt indicate how often re-dusting will be required. At present it is believed that the incombustible content is reduced about 3 percent in 30 days.

The extensive program of rock dusting the large number of mines owned by this company necessitated rapid and efficient means of applying the dust and led, naturally, to the development of a machine for that purpose.

The machine now used was finally adopted as a standard after much experimental work, carried on by the mechanical department, under the directions of the officials in charge of rock dusting operations. It is, in fact, about the sixth generation in line of evolution from the original machine, and some of its features are worthy of note. Weighing little more than a pit wagon and with short wheel base it can be taken over any track or around any curve in the mine. Two men can turn it around when it is necessary to reverse the direction of travel. Positive uniform feed of 125 pounds of dust per minute is effected by a spiral conveyor feeding the dust through a tube into the fan discharge pipe. This characteristic makes it possible to apply any desired amount of dust per lineal foot by simply regulating the speed of travel. To carry this large amount, dust requires about 4,000 cubic feet of air per minute moving at a speed of 6,000 feet per minute. A special fan mounted at the armature shaft of the motor provides the air current. The feeding mechanism is driven from a pinion on the fan wheel hub. For delivering the dust to the surfaces to be coated an expanding pipe terminates in a (Continued on page 228)



Dusting Machines of the Pittsburgh Coal Company. Below, the One Now Used and, above, the Original Machine

## ROCK DUSTING AT THE OLD BEN COAL CORPORATION

*Rock Dusting Has Evolved Beyond The Theoretical Stage And Is Almost Universally Accepted As A Practical Solution For Coal Mine Explosions—The Old Ben Coal Corporation Has Produced 35,000,000 Tons Of Coal Without An Explosion, And Is An Example Of Results That May Be Obtained By Applying Rock Dust*

THE prevention of the propagation of an explosion was partially solved in Sir Humphrey Davy's day by cooling the gases below the temperature of ignition. The invention of the wire gauze was a big step in advancement for coal mining, making possible the development of mining fields which would otherwise have been impossible at that time.

The absorbing effect of the wire gauze in relation to the heat was fully understood. Explosions were considered in terms of explosive gases however and coal dust was not considered a factor, the explosions which occurred being usually local gas explosions.

With the evolution of ventilation methods the explosion hazard increased because of the greater increase of open lights and purer air in the mines which with the coal dust increased the possibility of an explosion disaster.

The knowledge of coal dust being an explosive hazard was early recognized and the difference in disaster experience between wet and dry mines was probably noted. This would naturally develop efforts of safeguarding mines against coal dust explosion propagation by the adoption of watering methods to prevent the coal dust from being thrown into suspension.

In the early days mines were small and extensive areas were not worked from one operation. The efficient watering of a small shallow mine is easily done and so kept since the mine temperature approximates that of the surface.

Disastrous explosions are so separated as to time and distance usually that ex-

By J. E. JONES\*

perience has been a slow method of solution. It is strange that the principal of the safety lamp gauze was not adopted inasmuch as this was so thoroughly understood and was of such value in the solution of the most important mining problem of the day.

Rock dusting of mines whether by the installation of dust zones in strategic locations or by coating all accessible surfaces of the mine passages or both is upon a large scale the principal of the safety lamp gauze. The gauze in an explosive mixture of gas and air prevents the propagation of the explosion from the interior of the lamp into the surrounding explosive mixture by the absorption of heat into the gauze, this gauze being a partition between high and low temperatures keeping the temperature outside of the gauze below the ignition point. Likewise rock dust may be considered as being a partition between high and low temperatures lowering the temperature of a local explosion below that of ignition and stopping the distillation of the coal dust into gas.

Rock dust as a prevention of disastrous explosions has evolved beyond the theoretical stage and is almost universally accepted as being a practical solution of this important hazard in coal mining. The success of the experimental work done by the United States Bureau of Mines in their laboratories and experimental mine and the success of the Old Ben Coal Corporation in Southern Illinois in actual mine operation over a period of nearly eight years during which time 35,000,000 tons of coal were

produced is proof as to the merits of rock dusting. While many coal companies are installing the dust many more are in the contemplating stage, the hesitancy apparently being due to the questions as to the best method of installation, cost and what legislation may require. The answers to these are very much interwoven into each other.

The experience of Old Ben Coal Corporation as to the best method of installation is to make, insofar as practical, one rock dust zone of each entire mine; to have the incombustible content of the mine dust from the shaft bottom to the face that is finer than twenty-mesh dust greater than will permit the propagation of an explosion by coal dust. This of course, is not wholly practical because of inaccessible places for rock dust application and the injury to coal for marketing if applied at the working faces. It is possible and convenient to coat all surfaces quite economically on all haulage roads and in trackless passages that are accessible to haulage at 200 feet intervals so that the percentage of incombustible dust will be as great or greater than 60 percent. Where rock dust coating is not possible such as in abandoned territories or very difficult, such as in some air courses, these can be protected by the installation of the barricade system installing trough barricades at all entrances and at 300 to 500 feet intervals. In addition rock dust can be blown into the intake air current of these inaccessible places.

For complete rock dust protection in a mine the management must be as zealous in its application and continuity as in other departments such as with ven-



Entry, Pittsburgh Coal Company, Showing the Lighting Effect Resulting from Rock Dusting

tilation and haulage. In these last two mentioned the mine organization rather automatically takes care of their progress as the mine develops. Such progress should be true in rock dusting not permitting inaction for several weeks or perhaps a few months awaiting a large territory or territories to be dusted. The rock dusting of trackless passages is the most difficult and costly and especially is this true in mines where four or more entries are driven in abreast. All such entries should be given a thorough coating of dust before the track is taken out and a supply of dust left in each passage which will later have no track. For such continuous dusting each mine should have its own distributor.

The kind of dusting a mine will get depends largely upon the type of men employed to do the dusting and the interest they will take in the work as well as the interest taken by the management. Until such men are found and are trained in the correct application of the dust the boss of the section of the mine dusted should accompany the distributor to make certain that good work is done. Since the operation of a mine is not de-

pendent upon rock dusting it is quite easy to give the mine a second grade dust application.

The cost of rock dusting is almost wholly dependent upon the cost per ton of the dust delivered in the mine and the extent of the mine workings. The cost for protecting a mine developed over a square mile of territory will be the same for the mine whether it produces 1,000 tons or 5,000 tons per day. The cost for dusting new development work in the smaller mine will, of course, be one-fifth that of the larger mine. The mine conditions being the same the cost for dusting 1,000 feet of entry should be equal.

The following is a formula that may be applied to get an approximate cost per ton of coal for rock dusting by the coating method. Cost of distributor is not included and would be negligible if spread over a period of years.

$$C = \frac{N \left( E + \frac{D}{35} \right) \left( P \frac{3R+L}{35} \right)}{A}$$

Where C is cost for dusting per ton of coal produced.

N is number of dustings per year  
E is entries, length in feet.

D is development of entries in feet per year.

P is perimeter in feet; of entries.

R is rock dust cost per pound, delivered into the mine.

L is labor cost per lineal foot of dust application.

A is annual tonnage of mine.

The formula is based on three pounds of dust applied per lineal foot of entry, a unit entry of 35 feet in perimeter and all entries equipped with track or available from a haulage entry.

Assuming a large new mine having an annual production of 800,000 tons; 60,000 lineal feet of available entries for dusting; an annual entry development of 50,000 lineal feet; a cost of \$6.00 per ton for rock dust delivered into the mine; cost of 0.2 cents for labor per lineal foot based upon 7,500 lineal feet of entries dusted by two men at \$7.50 per shift and three dustings per year.

Substituting these values:—

$$C = \frac{3 \left( 60000 + \frac{50000}{2} \right) \left( 35 \frac{0.9+0.2}{35} \right)}{800000}$$

$$= \frac{35}{100} \text{ cents}$$

$$= \$0.0035$$

Assuming the same mine several years later having 200,000 lineal feet of entries available for dusting:—

Cost will be \$.0093.

Assuming a smaller mine with a lower coal seam and substituting its corresponding values:—

$$C = \frac{3 \left( 50000 + \frac{20000}{2} \right) \left( 30 \frac{0.9+0.2}{35} \right)}{800000}$$

$$= \$0.0057$$

The initial cost for protection of inaccessible territory would be greater considering the trough system, but such installation would be more permanent and could be of such permanency as to be of less cost than the coating system if considered over a period of years.

Legislation concerning rock dusting is being considered but fortunately is awaiting developments in this comparative new field of safety. There is no doubt but that a broad application will be given and that whatever efficient method of rock dusting is applied will fit into the requirements. The simplest method of dusting in accessible places will be the most efficient legislation.

The exact conditions of a mine as to its dust hazard or safety may be ascertained. The following tabulation of the inspection and analyses of a coal mine is given to show the ash contents in typical locations of a well dusted mine. All samples contain more ash than is required to prevent propagation except

Sample number	Location	Percentage of ash through 100-mesh		Remarks
		Roof and ribs	Floor	
		Percent	Percent	
1	West empty track exit.	86	64	Dusted 8 weeks prior to taking of samples.
2	Intersection of M W and 3 S W haulage.	82	54	Dusted 11 weeks prior to taking of samples.
3	3 S W at panel No. 13. Out by end of parting.	90	40	Dusted 11 weeks prior to taking of samples.
4	4 S W aircourse. Location is opposite where samples No. 3 were taken.	27	48	No track and has not been dusted except blowing dust into aircourse. Trough zones at 500-foot intervals.
5	M W haulage in by 5 S W.	87	39	Dusted 11 weeks prior to taking of samples.
6	M W manway. Location is opposite where samples No. 5 were taken.	33	38	Dust blown into manway at 200-foot intervals. Samples taken near end of 200-foot interval.
7	Intersection of 7 N-7 S and M N haulage roads.	88	59	Dusted 11 weeks prior to taking of samples.
8	M E haulage. Out by empty run-around.	70	53	Dusted 11 weeks prior to taking of samples.
9	M E haulage midway between 6 N and 7 N.	83	48	Dusted 11 weeks prior to taking of samples.
10	M E manway. Location is opposite where samples No. 9 were taken.	44	78	Dust blown into manway at 200-foot intervals. Sample taken about 60 feet from dusting point.
11	2 N panel off 2 E-8 N E near room No. 1.	63	48	Dusted 12 months prior to taking of samples.
12	1 E aircourse off 8 N E out by 1 N panel.	29	34	No track and has not been shale dusted except that thrown into suspension while installing troughs. Trough zones installed at 500-foot intervals.
13	Entrance to 2 W panel off 5 S E.	82	69	Panels sealed. Trough zones installed at all sealed entrances.



numbers 4, 10 and 12, the locations of which are well protected with dust trough zones and sample No. 6. In looking for places that were not sufficiently dusted this one location was found. However, the manway 20 feet in one direction and 50 feet in another direction had an abundance of rock dust.

## ROCK DUSTING BY PITTSBURGH COAL CO.

(Continued from page 225)

fixed nozzle. This nozzle is semi-circular in form with a straight bottom made with an inner and outer shell. The dust upon entering the nozzle is deflected by the inner shell and discharged at right angles to the surfaces to be dusted. By the inner shell and discharged almost at right angles to the surfaces to be dusted. By this means the dust is made to travel the shortest route and strike the mine surfaces with maximum impact. Its direction of discharge also causes it to travel a greater distance into break throughs, holes or high places. Dust is discharged around the entire perimeter of the nozzle, making it impossible to slight any of the surfaces to be dusted. In practice it has been found that in most entries free dust settles to the bottom in sufficient quantity to give the required percentage of incombustible content. For this reason the bottom or straight side of the nozzle is provided with a slide and may be closed, allowing all the dust to be discharged around the semi-circular part of the nozzle, in the direction of the roof and ribs. The dusting train, which consists of a dusting machine and one or two pit wagons loaded with rock dust, in bags, is hauled against the ventilating current at a speed of 40 to 45 feet per minute, corresponding to a dust deposit of 3 pounds per lineal foot. At this speed the dust cloud remains in the rear of the dusting machine, leaving the operators in a clear atmosphere.

Trolley type locomotives are used to haul the train, additional resistance being connected in the circuit to enable the motor to operate at the slow speed required. Special dust train haulage motors improvised from obsolete self propelled mining machines are also used at some mines. These trucks are refitted with both trolley pole, cable reel and a slow speed chain drive. The original propelling chain drive is also left on the machine. During the operation of dusting travel is effected through the slow speed drive. Movement of the outfit to a new location is more quickly accomplished by using the higher speed propelling chain drive. Animal haulage is also used to some extent. The gait

of a horse is far too fast but very satisfactory results are obtained in one application by halting the animal for short periods at regular intervals. In fact a dust coat applied in this manner is as uniform as when applied by a machine in continuous motion.

No systematic rock dusting of the return air-ways has been undertaken as yet, but some experimental work has been done. The dusting machine is used with the nozzle removed and 10-inch canvas hose with metal elbows substituted. The machine is held stationary and the hose passed through openings in the stoppings. An elbow and a short section of sheet metal pipe on the discharge end serve to direct the dust along the airway. Very satisfactory results have been obtained discharging dust through 100 feet of hose with as many as three elbows in the line. Set ups are made at about 500-foot intervals and 1,500 pounds of dust discharged at each location. While the dust deposit is not as uniform per lineal foot as when applied by a machine in motion, efficient dust zones are produced by this method. At the present time about 50 miles of entry have been dusted in 10 mines and the work is but fairly started.

The rock dusting program of this company is probably the most extensive of any now practiced or contemplated. Theory and practice have been reduced to a practical working system but experiments are still being carried on with a view to further improvements and greater safety—both of which will undoubtedly follow.

## FIRST-AID AND MINE-RESCUE CONTEST

THE Fourth International First-Aid and Mine-Rescue Contest, open to all miners, quarrymen and workers in metallurgical plants, will be held at Springfield, Ill., September 10, 11 and 12, 1925, under the auspices of the Bureau of Mines, Department of the Interior, according to an announcement by the Acting Secretary of the Interior.

These international first-aid and mine-rescue contests are held annually under the auspices of the Bureau of Mines, with the cooperation of the American National Red Cross, the National Safety Council, and various mine operators' associations and miners' organizations, with the object of furthering the work of training miners in first-aid and mine-rescue methods, and the consequent advancement of the cause of safety among the million miners of the United States.

The first-aid and mine-rescue contests will be for international championships, and international contest cups, medals, and prizes will be awarded to the winners. Proficiency of contesting teams

will be determined in accordance with Bureau of Mines' standards by judges thoroughly familiar with first-aid and mine-rescue work.

A feature of the meet will be the awarding of the congressional medals which is given annually to the miners adjudged to be most thoroughly skilled in first-aid and mine-rescue methods.

Another interesting feature will be the awarding of the medals offered annually by the Joseph A. Holmes Safety Association in commemoration of notable deeds of heroism performed by miners in succoring their comrades imperiled at mine fires and disasters.

More than 130,000 miners have already been trained in first-aid-to-the-injured and mine-rescue methods by the Bureau of Mines, and this event promises to be an important step toward the promotion of safety and efficiency in mining. A large attendance of miners is expected at the contest at Springfield and it is anticipated that many prominent representatives of the mining industry, who have taken a keen interest in industrial safety, will be present.

All organizations interested in the contest are invited to enter one or more first-aid and mine-rescue teams. Entries will close at the Pittsburgh, Pa., station of the Bureau of Mines, August 26. No fee is required for entering a team, but all entries must be on or prior to that date in order that the necessary arrangements may be made for the contest. Entry blanks, together with the general rules of the contest, can be obtained from the Bureau of Mines, 4800 Forbes Street, Pittsburgh, Pa. It is expected that each team will provide its own rescue and first-aid equipment and defray its own expense for transportation, lodging, and subsistence.

Acting Secretary Finney further requests that if any interested organization has any suggestions to offer in connection with the meet, it submit them as early as possible.

## AWARD FOR SAFETY

The Beaver Valley Traction Company, a subsidiary of the Pittsburgh Railways Company, received the Rice Safety Award for 1924, at the recent annual banquet following the safety instruction course conducted by the Western Pennsylvania Safety Council at Pittsburgh.

The number of men employed in the mines of Nevada was 4,600 last year, as compared with 4,300 in 1923, while the number of fatal accidents for the year ending November 30, 1924, was fifteen and for the year previous was thirteen, according to the biennial report of A. J. Stinson, state inspector of mines.



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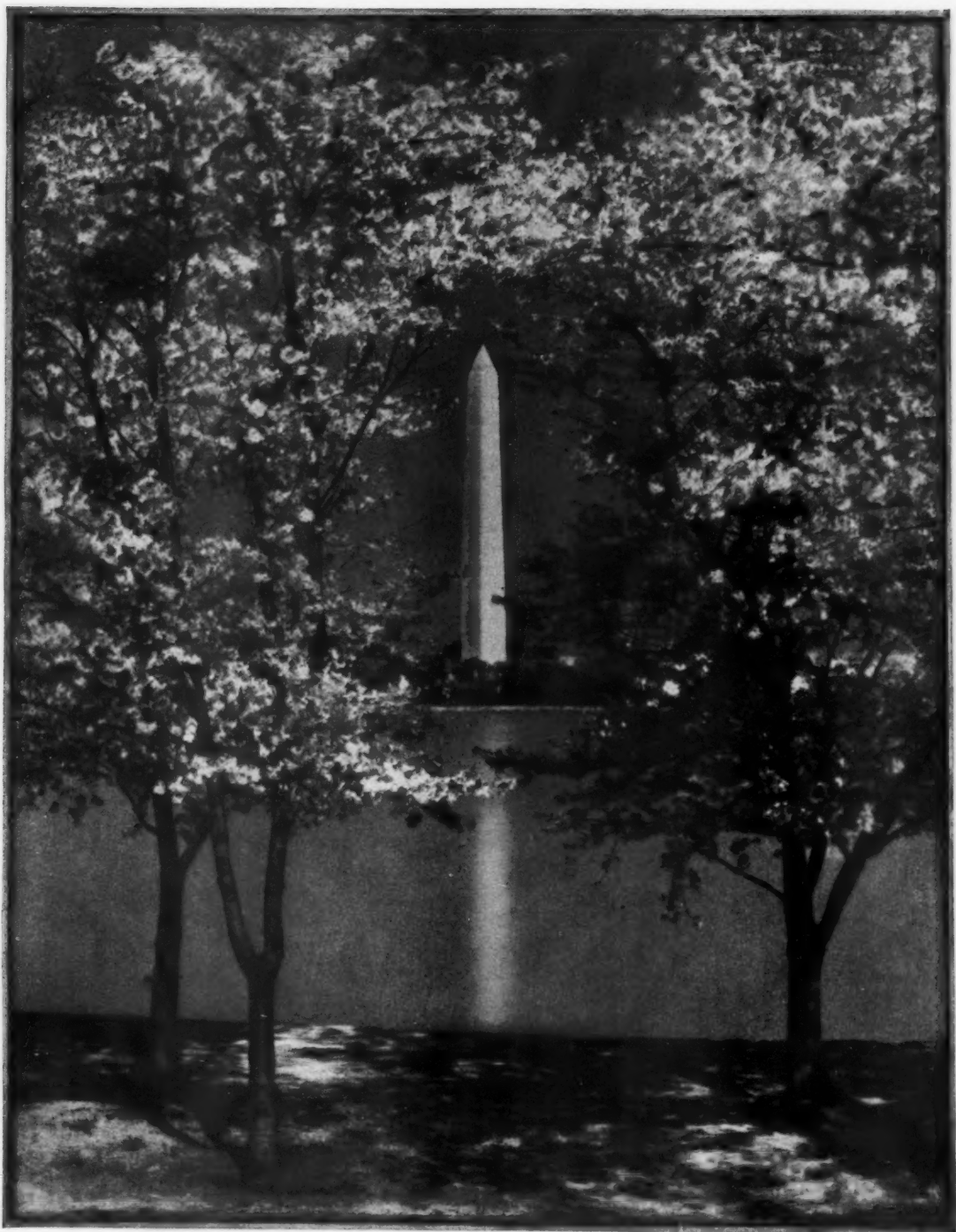
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*"The joyous book of Spring  
Lies open, writ in blossoms."*

## COAL'S MISADVENTURE WITH LABOR

*Story Of An Industry Which, Being Unable To Adjust Its Differences, Called In A Union—What Happens When Three Wage Scales Take The Place Of One*

By GEORGE H. CUSHING

**A**FTER one has sifted all of the evidence concerning the bituminous coal industry, he comes to the conclusion that what has been wrong with it for the last quarter of a century is that it has been too much impressed by the seeming impossibilities of its peculiar situation.

If any illustration of that statement is necessary, it is readily found in the fact that every coal man says there is too much coal in the ground and it is and has been too easy to get it. Therefore, it is too easy for new competition to spring up and thus too easy for somebody to cut everybody's price. Another illustration appears in this: It is obvious that all of the newspapers and public officials have been watching the actions of the coal industry for a quarter of a century. Every time the price of coal has risen a nickel a ton, somebody has made a demand for an investigation. This has made it impossible, seemingly, for the coal industry to work in cooperation and hence next to impossible for them to form an organization that would make the business profitable. On this account it was impossible to get coal men into an effective organization and impossible to persuade them to work together when they were in an organization; the fear of prosecution kept them apart.

The whole story is too long to tell in all of its details, and even if it were not, it is beside the point. The truth is that the coal men have been laboring under the newspaper-created belief that unless there was restraint of trade no profit was possible. In seeking a restraint upon trade, they seem to have sought it first in a possible limiting of the supply of their commodity. When that became impossible, they sought it by a kind of cooperative effort. And when that was prevented by the espionage of public agencies, they threw up their hands and said that the business could not be made profitable anyhow. It was a case of allowing the impossibilities to govern the whole thought of the trade. This overpowering fear of the impossibilities has paralyzed the industry and made it the prey to everybody who came along with a suggested outside influence which promised to do for the operators what they admitted they could not do for themselves. It was this very mood which threw the bituminous operators into the arms of the miners' union and brought the predicament which the industry now faces.

The one fact which is written largest in the whole of coal history is that the

miners' union was invited in as a stabilizing influence. The operators had been "going to town" to sell their coal; had been taking the best price they could obtain; and, having made the sale, had gone back home to make a new wage arrangement with their men. This had proved productive of a different wage schedule in every mine and, in many mines, after the closing of each contract. It was to stop this very practice that the miners' union was organized. The belief of both the miners and the operators was that if a wage schedule could be made uniform, the operators would have struck bedrock on their prices. They might cut down to, but never could, or would, cut under, the established labor cost of production. Thus the theory was that the uniform wage schedule would have a stabilizing influence on the price of coal.

Others may put such interpretation as pleases them upon this scrap of ancient history, but the fact is that the operators, being unable to handle their own affairs, invited in a union to do for them what they admitted they could not do for themselves. Literally, they put the whole matter of making the policy of the bituminous industry in the hands of an outside organization which had no stake in the game except a mere wage.

The obvious happened, of course. The force that was invited in to play the part of the master soon realized that it was indeed the master and proceeded to run the business in its own interest. That is what always happens—no matter whether the invited guest be a labor union or a government bureau or commission. The surrender of mastery merely builds a new master who sooner or later recognizes his power.

The tragic humor which attaches to later coal history centers in one fact which would be unbelievable if it were not part of the history of an enlightened and advanced nation. After the coal industry had pursued that experiment for a quarter of a century and after the new master was so thoroughly installed in his job that a president of the United States said, openly, that the people were at the mercy of the union, the proposal was actually made that we try to stabilize the industry by means of a labor contract. Frankly, that is a piece of grim humor which has no equal in American history—the coal industry being urged to find its way out of its trouble by signing a long time contract with the very agency which had brought

it to the brink of ruin. Only one more detail could possibly be any funnier than that and it was supplied. Coupled with this recommendation was another, namely, that the bituminous industry should try to find peace and prosperity by bankrupting a third of its mining companies and by driving out of business most of its selling organizations. It is doubtful if anything more farcical has ever been seen or heard of in the whole history of American business.

What made matters even worse was the fact that, at the time the experiment was started, it was known that only 60 percent of the mines were unionized. This meant that the other 40 percent were nonunion. The assumption seemed to be that, somehow, the killing off of the union mines would in no way tempt the nonunion mines to expand. It was, therefore, assumed that when the union mines had to pay a high wage, the nonunion mines would do the same thing—perhaps out of the goodness of their hearts or to avoid causing their unionized competitors any annoyance through loss of business. If this project had not been recommended by a dignified body with illustrious names attached to the writing, one would imagine that some children had been playing in our economic garden.

The unfortunate fact is that we had, at the time the experiment started, two groups of mines which could and did adopt two different wage schedules. And, as always happens, the one having the lower wage schedule and the lower price took the major part of the business. Then, as was almost sure to happen, the others who could neither sell their coal nor get a price for what they did sell, fell into the gravest kind of difficulty. They went broke. When they did so, we were faced by two facts. One was that the owner of the mine could no longer carry on. The other was that the hole in the ground had not been liquidated and the miners who had worked therein had neither been disintegrated nor provided with other employment. A companion fact to the latter was that communities had grown up around these coal mines and they either had to have the sustenance of the mine or they, too, would perish. Thus the one accomplished fact was the bankruptcy of the owner; what remained to be done was to support the community which had depended upon the, now, departed operator.

The miners could not move away and refused to starve. The business community could not be uprooted violently and refused to move away of its own

volition. So, when the operator fell out of line, the miners and the community merely closed the ranks and took over the property. The men worked as before; they hired the same old management; and the community supplied the needed cash. It was what anyone, with the imagination of a guinea hen, might have foreseen.

At this juncture develops the most amazing part of the whole story. The operators, in the first place, invited the union into the field to end *the reign of wages based on selling prices*. When the union went to seed and when the operators went broke, through trying the experiment, *the miners went back to the exact situation from which they started nearly 30 years ago*. In fact, they are not merely changing their wages with each contract as they once did; they have gone even further back. They are accepting as their wages a percentage of the selling price of the coal. Today, their wages change with the sale of each car of coal. They have thrown to the wind every vestige of an assured wage and are taking their chances wholly and solely on the market price from day to day.

Thus we started into the experiment with one wage scale and the prospect—one might almost say assurance—of two. Before the end of a year, we had three wage scales. Here again, the universal rule applies. The mines having the lowest wage scale are those which can name the lowest price; they are the ones which make the market. The net result is that we set out to—and did—bankrupt a third of the mine owners. But, instead of that relieving the situation, it forced the abandoned mines into a position where they, in turn, are bankrupting the two other groups of mines—those which were expected to remain and to save the coal industry for the nation.

It is a little late in the day to begin talking about such things. It may not be too late, however, to save a bad situation. As opposed to the impossibilities which have so impressed the operators, there are these facts:

1. It is true there is an abundance of coal. But, so are there an abundance of sites for factories, for stores and for railway rights of way. Indeed, no single business possibility in America has been exhausted. And, no real business man waits for success until conditions make it automatic; if all did that, there would be no business.

2. It is true that coal has been produced in larger quantities than are necessary. But, nobody compelled that production. The operators have merely misread their figures. Rather, they did not compile their figures in the right kind of a way. They based their pro-

duction on the last largest output. They should have based it on the average of the last five years.

3. The greatest need of the coal industry is not for favorable conditions. *It is for managers and merchants.*

Those three facts provide a satisfactory formula for coal's reconstruction—provided the operators are willing to undertake the handling of their own affairs instead of inviting in a stranger to do it.

## CORRELATION OF COAL BEDS

THE results of a study of the correlation of coal beds of the Allegheny formation of Western Pennsylvania and Eastern Ohio are given in Bulletin 10, just published by the Carnegie Institute of Technology, Pittsburgh, Pa., in the course of a cooperative agreement with the Department of the Interior. The correlation of coal beds, or their identification in one or more States or in several districts of one State, is of practical value to the coal operator and coal dealer, as by this means they are able to state definitely from which bed their coal comes.

Work on correlation of coal beds has been done in Western Pennsylvania and Eastern Ohio by State and Federal geological surveys employing stratigraphic and paleontological methods. During the past three years the Bureau of Mines of the Interior Department, through Reinhardt Thiessen, research chemist, and the Carnegie Institute of Technology, through a fellowship in charge of Mr. Thiessen, have been correlating coal beds by means of a microscopic study of the spores in the coals. In 1923 the beds in the Monongahela formation in Western Pennsylvania, Eastern Ohio, and Western Virginia, were correlated; and in 1924 the Allegheny formation in Western Pennsylvania and Eastern Ohio was studied. Samples of coal were obtained from 38 mines in Pennsylvania and Ohio, and the coals were first examined visually and then microscopically when prepared in thin sections. The coals were from the Lower, Middle and Upper Kittanning beds, and the Lower and Upper Freeport beds. As a result of this investigation it has been possible to correlate each bed by means of spores and other structures found therein. Distinct spore forms were observed in the coal of the five beds examined, even as much as 100 miles apart in the Lower Kittanning bed. These spores are described, provisionally named, and illustrated in Bulletin 10, copies of which may be obtained from the Carnegie Institute of Technology, Pittsburgh, Pa., or from the Department of the Interior, Bureau of Mines, Washington, D. C.

## COAL LEASES

COAL leases, permits, and licenses have been issued on approximately 800,000 acres of public lands with an estimated coal tonnage of 785,000,000 up to March 31, 1925, according to information made public at the Interior Department.

The terms of these leases and permits, which number 963, require an investment by private individuals and companies holding them of \$6,782,450 and a minimum annual production of coal amounting to 3,922,600 tons, including the payment of a royalty to the Government on all coal produced.

These coal permits and leases, including all licenses to explore for coal, have been issued by the Government in all of the public land states. Colorado leads in number with 218, while Wyoming is second in the list with 196. Following are the states with the number of coal permits, leases, and licenses issued on public lands within their boundaries: Alabama, 1; Arizona, 2; Arkansas, 1; California, 10; Colorado, 218; Idaho, 14; Montana, 122; Nevada, 39; New Mexico, 74; North Dakota, 33; Oregon, 32; South Dakota, 7; Utah, 128; Washington, 45, and Wyoming, 196.

In the Territory of Alaska 29 coal permits and 10 coal leases have been issued by the Interior Department on approximately 61,000 acres of public land, requiring a capital investment of approximately \$1,204,000.

## LANDS FOR EASTERN NATIONAL FORESTS

THE National Forest Reservation Commission at a recent meeting authorized the purchase at an average price of \$4.77 an acre of 12,817 acres in the Eastern States, of which 6,573 acres are in Tennessee, 4,258 in Pennsylvania, 905 acres in Virginia, 287 acres in North Carolina, 66 acres in Georgia, 300 acres in Alabama, and 428 acres in Arkansas. W. W. Ashe, secretary of the National Forest Reservation Commission, states that these purchases bring the total area, the purchase of which has been authorized during the current fiscal year, up to 247,067 acres. Of the area being acquired during the current year more than 30,000 acres are in Pennsylvania, 17,000 in Virginia, 66,000 in Tennessee, 24,400 in North Carolina, 40,000 in Georgia, 5,900 in Alabama, 1,700 in Arkansas, 3,800 in West Virginia, 22,000 in South Carolina, and 21,600 in New Hampshire.

A measure that would make rock dusting compulsory in all bituminous mines of Pennsylvania has been introduced in the Pennsylvania legislature by Representative Heffran, of Washington County.



## SENATE INVESTIGATION OF DEPLETION ALLOWANCES

### *Revenue Investigation Points To Proposed Changes In Income Tax Laws With Relation To Depletion, Discovery, Reorganizations, Dividends, and Gain Or Loss From Sales*

THE Senate Committee on Investigation of the Bureau of Internal Revenue will continue its work after June 1 in order to complete statistical and other data upon which its report to the Senate next December will be based. In order to do this it is reported that the committee has required the bureau to furnish photostatic copies of hundreds of individual and corporation income tax returns and schedules filed in connection with the returns.

The Senate resolution authorizing the committee to continue its work after March 4, 1925, provides that its representatives "shall be withdrawn from the offices of the bureau by June 1, 1925, and hearings shall cease on or before that date and no original files shall be withdrawn after said date; but any papers or files requested by the agents of the committee on or before May 15, 1925, shall be available to the agents of the committee for examination for two weeks after the same are furnished." The committee apparently construes this to mean that the provision prohibiting the examination and withdrawal of original files after June 1 does not apply to photostatic copies of the papers and files.

#### CORPORATION RETURNS

Counsel for the committee has announced that "from the corporate returns we are tabulating the net income, both taxable and tax exempt, the distribution of that income as dividends, the amount distributed, and the tax. We are also tabulating a summary of the balance sheets for the purpose of showing the extent to which the undistributed earnings are being reinvested in the business or being invested in outside investments.

"Before making these tabulations all of these corporations are classified, first, on the basis of the distribution of their income as dividends; second, on the basis of the relationship of their net earnings to their combined capital, surplus, and undivided earnings; third, on the basis of proportions of total stock of the corporation controlled by the officers; and, fourth, on the basis of the nature of the business of the corporation.

"That will reflect the extent to which corporate net earnings are not subjected to individual income taxes; it will reflect the ability of the corporation to distribute; it will reflect the nature of the corporations, as to whether their stock is closely held or widely distributed, and it will reflect the percentage

of earnings in the different corporate classes from the standpoint of the extent to which they distribute their earnings. It all goes to the question of the extent to which corporate earnings are escaping individual income taxes."

#### AMENDMENTS BEING CONSIDERED

The foregoing statements indicate that the committee intends to make some recommendations regarding the enforcement of Section 220 of the revenue law which provides that if any corporation is availed of for the purpose of preventing the imposition of the surtax upon its shareholders through the medium of permitting its gains and profits to accumulate instead of being divided and distributed, such corporation shall be taxed an amount equal to 50 percent of its net income for each taxable year in which it accumulates such gains and profits, which tax shall be an addition to the normal tax.

In addition to the foregoing, the committee will make recommendations for the modification of the depletion section [Section 204 (c), Revenue Act of 1925] for the redrafting of the discovery clause, so as to prevent what the committee's engineers term "blanketing" of alleged proven oil fields with "technical" discoveries, for the revision of Section 201 relating to dividends and other distributions by corporations, for the closing of alleged gaps in the present reorganization provisions of Section 203, and for the amendment of Section 204 (a) prescribing the bases for determining gain or loss from the sale or other disposition of property.

#### DISCOVERY CLAUSE

Particular attention has been given by the committee to the oil situation, and more especially to discovery depletion. In reviewing the history of the discovery clause, counsel for the committee stated that at the time the 1918 revenue act was under consideration the country was consuming 60,000 barrels of oil a day in excess of the production. It was stated that the production of oil required to meet the needs of this country and its allies during the war depended very largely upon stimulating prospectors and stimulating wildcatting, and it was represented to the committees of the House and Senate that the tax laws as then in force had the effect of discouraging the prospecting and exploration necessary to develop new oil fields and to increase production.

Counsel for the committee stated fur-

ther that "at that time the tax, which could run as high as 80 percent, was claimed to fall too heavily upon the shoulders of the small prospector who had perhaps prospected for oil for five or six or eight or ten years before he made a strike. He, therefore, had no income during those years in which he made no strikes against which he could offset the losses that he had suffered during those years; and when he did make a strike, 80 percent of what he got out of it would go to the Government in the shape of taxes."

In conclusion, counsel stated that "it is manifest that this oil discovery provision was inserted in the statute to meet a situation existing in 1918, namely, we were at war, the country was not producing what it was consuming, and the representation was made that it was necessary to take care of the little fellow, the little prospector and wildcatter in order that the prospecting and wildcatting might go on, that new wells be brought in and our oil supply kept up or increased.

"I call the committee's attention to the fact that that situation is entirely changed. We will supply the committee with data showing that instead of the country now producing less oil than it is consuming, the fact of the matter is that the trouble is just the other way. The country is producing more than it can consume; so that, instead of there being an emergency requiring the stimulation of wildcatting, the very necessity of conserving our resources at a time when we are producing more than we require has exactly the opposite effect."

The tabulations submitted in this connection to the committee were designed to show that 36.3 percent of the discovery value of oil allowed has been to small operators and that 63.7 percent has gone to large operators. In commenting upon this, counsel for the committee charged "that but a small percentage of the relief afforded by the statute in the shape of taxes has gone to the fellow for whose benefit the statute was originally enacted into law. About two-thirds of all the loss in taxes to the Government has been suffered to the advantage of someone who was never contemplated by the statute at the time it was written into the law."

The data on discovery values prepared for the committee from the records of the oil and gas section of the Engineering Division, Income Tax Unit, shows that during the years 1918 to 1923, in-

clusive, there were 8,450 cases in which discoveries were allowed and 5,221 unconsidered cases on hand December 21, 1924—a total of 13,671 cases in which discoveries were claimed. Of this number it was alleged by counsel for the committee that only 35 claims for discovery were allowed to those who actually discovered new oil pools and that all other discovery claims allowed were claims of individuals and corporations who drilled in territory that was known to contain oil.

The committee's consulting engineer, in his report, states that the law places no limit on the number of wells that may be set up for discovery purposes. He asserts that "a discovery well should be defined as a commercial well 3 to 5 miles from any other commercial well. This would prevent blanketing of a pool. Unless a limiting definition can be drafted into the law, the discovery clause should be eliminated."

#### DEPLETION

It developed in the hearings before the committee that instances had been found by engineers of the committee where, in their opinions, too much depletion had been allowed by the department on account of the valuation methods used in arriving at the basic valuations of mining properties. Criticism was directed particularly to analytical appraisals. It was contended by one of the committee's engineers that: "The analytical appraisal gives the starting point at which negotiations between a willing seller and a willing buyer begin, not the price at which the deal is made." In this connection this engineer stated: "Vague ideas are often entertained regarding the value of a mine or oil well. It has been asserted that a mine or well is worth whatever it contains, that its full value is attained as soon as ore or oil is discovered, that this value is capital and that the extraction of the mineral values is like drawing money from a savings bank. Such ideas are ridiculously absurd. Of what value to you is a ton of gold on the moon, although it may be possible to discover it by means of a powerful telescope? Is that gold wealth?"

#### NO INTRINSIC VALUE

"Nothing is valuable except to the extent that it has been brought by human efforts to that stage or station whereby it may be of benefit to mankind. Natural resources are practically worthless until an industry is started upon them. Ore or oil in the ground is no more capital than gold on the moon, and has little or no economic value until it is developed, taken out, and utilized. It is true the discovery of ore or oil often presents such favorable potential and speculative values through the possibilities of its utilization that its purchase and development is the proper object for

the expenditure of capital; this expenditure absorbs capital instead of yielding it. The extraction of the minerals in excess of the amount expended may yield new capital in the form of profits. These profits, however, do not become capital unless reinvested.

"At best the theory and method of the appraisal of mining or oil property involves many variables and determination of the present worth of expected profits from potential values. A vague and indefinite basis from which to start! After estimating the probable quantity of ore or oil developed and prospective, forecasting the future production costs, and averaging fluctuating prices, as well as giving due consideration to the rate of mining or the life of the mine or well as possibly affected by market and other conditions, the ad valorem appraisal should be discounted liberally by applying a factor of safety as evidence of good faith, so that a prospective purchaser will at least have a fair chance to make a reasonable profit on what is at best a hazardous venture."

#### NEW BASIS ADVOCATED

In discussing the difficulties of administering the depletion section of the law under existing regulations, L. C. Graton, mining geologist and a member of the engineering faculty of Harvard University, defended the analytical appraisal method of arriving at valuations and sharply criticized some of the contentions made by a representative of the Metals Valuation Section of the Internal Revenue Bureau with respect to the accuracy or inaccuracy of factors upon which the valuations of metal mines are based. Mr. Graton said that the analytical appraisal method was a proper way to value a mine; that this method of valuing a mine was fixed and determined long before Congress gave any thought to the matter of depletion.

Mr. Graton stated, however, that the method of arriving at a valuation does not necessarily govern the particular way in which depletion should be computed. In this connection he said: "It is my conviction, which I understand is shared by all who have been confronted with this problem, that the fairest way, the simplest way, the most direct and least expensive way of arriving at depletion is not on the unit basis per pound of metal, the method now in use, but on the basis of percentage of operating income; and if that method had been adopted by the bureau, the collection of the tax would have been very much simpler. I believe that everybody who has approached this question in a fair and understanding frame of mind is convinced of the simplicity and directness of that method."

The question of determining depletion on the basis of a percentage of operating

income has been discussed in the annual conferences on mine taxation held under the auspices of the American Mining Congress. In the conference of 1923, held at Milwaukee, Wis., Paul Armitage, chairman of the General Tax Committee, stated that certain advantages were claimed for this method: (1) That it insures to the mine owner the actual value of his property at the basic date, based on the true value of the earnings instead of the estimated or average value; (2) it gives relatively higher deductions in years of large profits; (3) from the Government standpoint it insures a taxable net income in any year in which profit is made; (4) the Government revenues from the mining industry would be more evenly distributed instead of being abnormally high in some years and negligible in others; (5) it would greatly simplify administration and expedite the task of auditing the returns of mining companies.

This plan was again discussed in 1924 at the tax conference at Sacramento, Calif., by A. P. Ramstedt, formerly a member of the Tax Advisory Board of the Treasury and at present a member of the General Tax Committee of the American Mining Congress. In addition to the advantages mentioned by Mr. Armitage, Mr. Ramstedt stated that the plan would eliminate estimating future prices of metal which are subject frequently to violent fluctuations; that it would eliminate estimating costs which change from year to year; that it would eliminate estimating annual production, which is bound to change on account of strikes, shutdowns and the common hazards of the business; it would eliminate estimating the life of a mining property which is so uncertain, and it would eliminate defects in the present method arising as the result of changes in the grade of ore.

The plan was referred to again in the hearings before the committee during the testimony of the valuation engineer representing the Revenue Bureau. This engineer stated: "The law specifies a reasonable allowance for depletion. The Commissioner has very considerable discretion in that matter and there are other ways of figuring the depletion allowances, besides the unit basis, such as depletion as a percentage of net income, which the American Mining Congress, the American Institute of Mining Engineers, and a great many of the able engineers of the bureau have thought was the only equitable basis for determining depletion deductions." In explaining the percentage of net income basis this engineer said: "The valuation being based upon the expected profit and the depletion deductions being deductions from income, it would not seem unreasonable to allow depletion deduc-

tions as a percentage of net income, because of the basis upon which you are determining the value. For instance, if you had \$100,000,000 accepted net income and you value that at \$30,000,000 in getting depletion and depreciation, it would not seem unreasonable to allow 30 percent of the actual operating profit as a deduction for depletion and depreciation."

A review of the discussions of this subject reveals the fact that several different formulae have been suggested for the determination of the percentage of net operating profits that would be taken each year as depletion. One suggestion has been that the percentage should be the ratio of present worth of the mining property at the basic date, as determined by the Revenue Bureau, to total expected operating profits, both of these factors having been determined already in practically all cases. Another suggestion is that the depletion should be based upon the market price of the unit of the product on which depletion is to be taken. For example, when the market price of the mineral is up, the unit rate for depletion would be greater and when the market price is below normal the rate would be less. As the formula proposed by the author of this suggestion is somewhat involved, it will not be reviewed in this article, but any interested reader may write the Tax Division of the American Mining Congress for detailed information concerning it. The other formulae for determining depletion as a percentage of profits will be found in the 1923 proceedings of the conference on mine taxation in Mr. Armitage's article beginning on page 76 of those proceedings.

It is imperative that the mining industry shall take cognizance of the discussions before the Senate committee concerning depletion inasmuch as the committee is very likely to recommend a drastic modification of the depletion section of the law in addition to a change in the discovery provision. It is believed that the committee is willing to recognize the principle of depletion, but it is important that no attempt shall be made to so amend the law that it will be impossible for any branch of the mining industry to obtain a fair and reasonable allowance.

#### CLAIRE FURNACE CASE TO BE REARGUED

**R**EARGUMENT before the Supreme Court of the United States of the Claire Furnace Company's cost data suit with the Federal Trade Commission, involving the right of the Commission to require cost reports from basic industries, has been ordered by the court, November 2. This case was argued in December, 1923.

A similar case is pending in the Dis-

trict of Columbia courts, in which the Maynard Coal Company won its contention that the Commission lacked authority to require the submission of this data.

#### REHEARING ASKED IN WAR MINERALS SUIT

**R**EHEARING by the Supreme Court of the suit of Logan Rives to recover losses sustained in the purchase of property for the production of war minerals is asked in a brief filed by A. H. Jarman.

The Supreme Court recently reversed a decision of the Court of Appeals of the District of Columbia which had issued a mandamus requiring the Interior Department to consider the Rives claim.

Mr. Jarman's contention is that the Supreme Court's action was not based on a proper statement of facts.

Much interest has been attached to this case, inasmuch as a decision upholding the purchase of property phase of war minerals expenditures would involve a huge sum of money.

#### GREAT LAKES-TO-THE-OCEAN WATERWAY PROJECT

**N**EGOTIATIONS have been completed between the United States and Canada for a joint investigation of the St. Lawrence waterway project to determine plans, cost amount of power developed, operating cost and all other engineering facts, according to Secretary of Commerce Hoover. The engineering work will start at once, Congress having appropriated \$275,000 for the purpose and the Canadian government having made the necessary appropriations.

"Parallel with this investigation," says Mr. Hoover, "there will also be an investigation which has been directed by Congress and covered by special appropriations, of the projected deep waterway from the Great Lakes to the Hudson River, to determine its feasibility, cost and operating problems.

"These two investigations should be completed within approximately twelve months and it will then be possible to finally determine national policies and to proceed with active steps in realization of the lakes to sea connection."

An exhaustive survey of the economic aspects of these outlets from the Great Lakes, the value of the development of electrical power from the St. Lawrence canal and other questions will be continued by the Department of Commerce.

Negotiations over the St. Lawrence have on the American side been carried out by the State Department under the general direction of the St. Lawrence Commission, which is composed of nine members, headed by Secretary of Commerce Herbert C. Hoover.

#### NATIONAL MUSEUM OF ENGINEERING AND INDUSTRY

**A**PPROACHED by sponsors of the National Museum of Engineering and Industry which it is proposed be established in Washington, D. C., under the supervision of the Smithsonian Institution "for commemorating the achievements and perpetuating the records of engineering and industrial progress," Secretary of Commerce Hoover stated:

"It is proper that this country which, in a comparatively short national life has contributed so much to the world in new inventions, discoveries, and improvement of processes, should establish this National Museum of Engineering and Industry.

"The individual initiative shown by American engineers, scientists, and industrialists is inspirational, their efforts having projected us rapidly forward industrially and contributed immeasurably to the comfort and happiness of our daily lives.

"This museum will fittingly record their efforts and stimulate further activities through a wider diffusion of the knowledge of what they have done."

The officers are:

Dr. Elihu Thomson, president; Dr. E. G. Acheson, Dr. Charles F. Brush, Dr. L. H. Backeland, Dr. Frank J. Sprague, Dr. Thomas A. Edison, Dr. Edward Weston, and Dr. Orville Wright, vice presidents; Mr. Thomas Ewing, Col. Michael Friedman, Dr. Ira N. Hollis, and Dr. Elmer A. Sperry, trustees; Dr. Charles W. Eliot, Gen. Geo. W. Goethals, Hon. Herbert Hoover, Dr. Charles M. Schwab, and Dr. Melville E. Stone, honorary members; Mr. George E. Roberts, treasurer; Mr. H. F. J. Porter, secretary.

In a statement submitted to Secretary Hoover, Mr. Porter says:

"The parent building, which will be the largest museum building in the world, will house the historical collections of the government from the Patent Office, Bureau of Standards, Mines, etc., and the Army and Navy, will replace the old Smithsonian Institution buildings, and affiliated with it in the large industrial centers of the different states will be museums of industry in which will be working demonstrations of the various industries. It is intended thus to develop a museum extension system with the central clearing house for museum information in Washington and through replicas, photographs, literature, lectures, etc., carry the museum to the people. This will be linked up with the educational system of the country so as to establish a visual means of vocational guidance for the youth of the nation and the development of progress in industry which this foremost of all the industrial nations has long needed and now demands."



## FEDERAL OIL CONSERVATION BOARD ASKS FOR SUGGESTIONS

*A Letter Has Been Sent, At The Request Of The President Of The United States, Through The Federal Oil Conservation Board, To Leaders In The Oil Industry, Asking For Cooperation And Suggestions In The Sweeping Inquiry Into The General Petroleum Situation—The American Mining Congress Submits Its Recommendations*

PROGRESS is being made in the work of the recently created Federal Oil Conservation Board, under the direction of Secretary of the Interior Work, Secretary of War Weeks, Secretary of the Navy Wilbur, and Secretary of Commerce Hoover. A letter was recently mailed to representative men in the oil industry, and to others informed upon the problems attending the distribution of crude petroleum and refined products, asking for such information and constructive suggestion as may contribute to the work of the board in its sweeping inquiry into the general petroleum situation. This letter, signed by Secretary Work, who is Chairman of the Oil Conservation Board, asked suggestions be submitted to the President of the United States, and pointed out that:

"Under the instructions of the President, this board is undertaking a comprehensive cooperative study of the problem which the United States is facing as the largest producer and the largest consumer of petroleum, with rapidly diminishing reserves; and as a part of its work it is addressing this letter to representatives of the technical press, and to those whose study of the subject and contact with the industry as authors, or as writers in an editorial, research, or similar capacity, make their observations and opinions of value in formulating a national policy covering various phases of the petroleum industry."

In transmitting his request to the Federal Oil Conservation Board, urging the cooperation of those informed upon the problems of the industry to cooperate with the board, President Coolidge stated:

"It is evident that the present methods of capturing our oil deposits is wasteful to an alarming degree in that it becomes impossible to conserve oil in the ground under our present leasing and royalty practices if a neighboring owner or lessee desires to gain possession of his deposits.

"Developing aircrafts indicate that our national defense must be supplemented, if not dominated, by aviation. It is even probable that the supremacy of nations may be determined by the possession of available petroleum and its products.

"I am advised that our current oil supply is kept up only by drilling many thousands of new wells each year, and that the failure to bring in producing wells for a two-year period would slow down the wheels of industry and bring

about serious industrial depression. The problem of a future shortage in fuel and lubricating oil, not to mention gasoline, must be avoided, or our manufacturing productivity will be curtailed to an extent not easily calculated.

"We are not today, however, facing an under supply of oil. The production of our 300,000 wells is in excess of our immediate requirements. That overproduction in itself encourages cheapness, which in turn leads to wastefulness and disregard of essential values. Oil, of which our resources are limited, is



Hon. Hubert Work, Secretary of the Interior, Chairman of the Federal Oil Conservation Board

largely taking the place of coal, the supply of which seems to be unlimited, but coal cannot take the place of oil in most of its higher uses, on land or sea or in the air.

"For the purpose of giving this responsibility of government in all of its aspects the consideration it demands, I have constituted a Federal Oil Conservation Board consisting of the Secretaries of War, Navy, Interior, and Commerce, to study the Government's responsibilities and to enlist the full cooperation of representatives of the oil industry in the investigation. The Government itself is at present one of the largest lessors of oil lands, and the public domain still in-

cludes large undeveloped reserves of oil, so that the administration of oil resources is a practical question with the Department of the Interior.

"I would express the desire that these conferences may be open and exhaustive. The oil industry itself might be permitted to determine its own future. That future might be left to the simple working of the law of supply and demand but for the patent fact that the oil industry's welfare is so intimately linked with the industrial prosperity and safety of the whole people that government and business can well join forces to work out this problem of practical conservation.

"Last March I appointed a commission to advise me on the special subject of the best policy to insure the future supply of fuel oil for the Navy. That commission will continue to function in its limited field and might to advantage sit with the Conservation Board in the conferences I expect will be between these four Secretaries directly concerned and the outstanding producers of petroleum. Similarly, the members of the Conservation Board will call upon their technical advisers in the bureaus to contribute to the full discussion of ways and means of safeguarding the national security through conservation of our oil.

"Very truly yours,  
(Signed) "CALVIN COOLIDGE."

This letter which was sent in accordance with the President's wishes specifically requests suggestions upon the following important phases of the oil industry:

1. Imminence of a petroleum shortage in this country.
2. How may future shortage be lessened?
  - a. Increased use of substitutes, including foreign oil, shale, coal or organic distillates.
  - b. Elimination of waste in production, transportation, refining and distribution.
  - c. Substitution of coal for fuel oil, more efficient types internal combustion engines.
  - d. Reducing exports of domestic crude petroleum and its products.
  - e. Increasing total recovery of petroleum in ground.
3. Shall we encourage use of oil for domestic heating or for generating steam?





Harris &amp; Ewing Photos.

Members of the Federal Oil Conservation Board: Hon. Herbert Hoover, Secretary of Commerce; Hon. Curtis D. Wilbur, Secretary of the Navy, and Hon. John W. Weeks, Secretary of War

4. Can we eliminate waste in retail distribution?
  - a. Are there too many links in the chain from producer to consumer?
  - b. Are there too many retail outlets?
5. Causes for the more or less temporary periods of overproduction.
  - a. Is it practicable to control production?
  - b. Is Mr. Doherty's proposal for unit operation feasible?
6. Is it possible to explore for new fields without bringing them into actual production? Is it practicable for government and industry to cooperate in setting aside drill-tested reserves?
7. Responsibility of the oil industry and the public to general welfare.
8. Exploration and development of foreign oil fields. How may our nationals be enabled to compete on more even terms with the nationals of other countries?
9. How may the government render specific assistance to the oil industry.

In response to the President's request, and the subsequent letter from Secretary of the Interior Work, The American Mining Congress, through James F. Callbreath, its secretary, submitted the following recommendations for consideration:

"It is with great interest that I reply to your letter of March 13 concerning a

symposium of opinion which you are assembling with a view to formulating a national policy on the various phases of the petroleum industry.

"Your first question is, 'To what extent is there a petroleum shortage in the United States?' That is a question which must be answered with explanations and reservations. I should say that the prospect of such a shortage is ultimate rather than imminent. Predictions of shortage in the production of petroleum have been made in the United States almost since the beginning of the industry.

"In the public mind there is a picture of the petroleum industry as a migratory camp moved about from one point of flush production to another in the United States. No picture could be further from the truth and no picture more vitally needs correction. With the discovery of every new field, there is the period of initial production, then a period of flush or peak production and then a period of long years of continued production.

"In 1862 the total production of oil in the United States was a little over 3,000,000 barrels. Two years later, in 1864, this had fallen off almost a 1,000,000 barrels, to a little over 2,000,000 barrels, and there were dire predictions of the exhausting of our oil reserves.

"In 1889 and 1890 the report of the United States Geological Survey stated:

"While petroleum has been found in nearly every state and territory, the localities in which it is produced in quantity are but few. These are well known oil regions of western Pennsylvania and

New York, and Turkey Foot and other districts of West Virginia, the Macksburg and Lima fields in Ohio, the Florence district of Colorado, and the oil fields of southern California. Practically all the petroleum produced in the United States is from the districts named, though a few thousand barrels were produced in Indiana, Kentucky, Illinois, Kansas and Texas in 1889 and 1890.

"Not only are the localities named above the chief petroleum producing districts in the United States, but the indications are that, with the possible exception of Wyoming, they will continue so to be. The Indiana field has some promise, and may be a producer of some importance in the future. The Kentucky and other southern oil fields, which at one time it was supposed would be factors of some importance in the oil production of the United States, give at the present time no such indication. The Illinois field is an exceedingly small one, with but little promise for the future, while the Kansas and Texas fields will at the best probably produce only a few thousand barrels each year of a high grade lubricating oil. However, there have been so many surprises in petroleum that these statements must be regarded as only setting forth the present indications.' This statement was repeated in its entirety in the 1891 report.

"The 1910 report stated, 'The petroleum industry in the United States has been characterized by phenomenal increase each year for the last four years. Each gain over the previous one has been so remarkable as to lead to the

belief that the limit has been reached, especially as petroleum is a commodity which should ordinarily keep pace with population. But on the contrary the product has increased more rapidly and irregularly. Thus, after varying approximately between 50,000,000 and 60,000,000 barrels in the decade between 1890 and 1900, the industry closed the century with an output of over 63,000,000 barrels in 1900, rose to 88,000,000 barrels in 1902, to 100,000,000 barrels in the succeeding year, to 117,000,000 barrels in 1904, and to nearly 135,000,000 barrels in 1905; and after a slight decline in 1906, the output rose again in 1907, reaching 166,000,000 barrels. Since then the growth has continued this phenomenal course to 178,000,000 barrels in 1908, to 183,170,874 barrels in 1909, and it passed the 200,000,000-barrel mark, attaining 209,555,048 barrels in 1910—a gain of 14.4 percent over the already excessive product of 1909. This has brought the total output since the beginning of the industry in the United States to more than 2,000,000,000 barrels. The excess of the product over the normal demand is shown by the fact that 209,000,000 barrels in 1910 brought a smaller total value (\$127,896,328) than 183,000,000 barrels the year before (\$128,328,487), and that the smaller product, 178,000,000 barrels in 1908, was valued at still more (\$129,079,184). As the production has gone up the average price per barrel has gone down from more than \$1 a barrel in 1900 to 73.1 cents in 1906, to 72.3 cents in 1907 and 1908, to 70.1 cents in 1909, and to 61 cents in 1910.

"In 1907 the same report stated, 'The petroleum production of the United States in 1907 was characterized by (1) a total output far in excess of any previous year, (2) an unparalleled accumulation of stocks, in spite of which (3) the price of all grades of oil was kept at a high level, the prices in California showing important advances.

"The sensational developments in production were the great increase in the new Illinois field and the phenomenal yield of the Glenn pool in Oklahoma, together with increase in both quantity and price in California."

"And for many successive years the same comments were made by the same reports. These reports are quoted not for their disparagement but to show that they were well founded on the best information of the time, which the future disproved. It is conceivable that the future will again allay our present concern.

"This production has increased from year to year until in 1923 it reached the aggregate total of 738,877,000 barrels, almost three-quarters of a billion barrels or 200 times as much as those early days of flush production and more than one-

third as much as was produced in the entire life of the industry up to 1910. We, the posterity concerning whose oil supply the scientists of a few decades ago were concerned, are able to have a greater oil supply by hundreds of times than was then thought to be existent.

"In 1920 there were more producing oil wells in every state in the Union except Colorado than ever before in the history of the United States. This includes the oil fields of the States of Pennsylvania and New York. In the last 20 years New York has produced from its wells an average of 1,000,000 barrels a year and Pennsylvania an average of 7,500,000 barrels. These fields have now been producing for three-quarters of a century.

"Throughout the development of civilization it has been shown that posterity has a habit of solving its own problems. It is entirely fitting and proper that political problems should be cared for in the passage of wise legislation but economic problems can neither be anticipated nor solved in advance. It is probable that the aborigines held solemn councils of war concerning the rapid exhaustion of deposits of flint. Had we at the beginning of this great republic set aside certain reserves of then valuable raw materials for posterity, we should have had a useless aggregation of small deposits of little value and laughable significance in comparison to the huge development which has taken place throughout the country.

"In the history of civilization the question presents itself: What great natural resource has been exhausted to the peril of civilization or of industry? The only one which can conceivably occur to us is natural gas. In the lessening of its supply there were necessarily readjustments in a few individual industries. But the real value to civilization in natural gas was in making possible the development of the uses of gas and the development of artificial gas. May not the same process more slowly take place in other fuels?

"It is rather the recorded history of civilization that with the lessening of supply of any material the economic pressure of its increased cost causes human intelligence to apply other materials to the same use with improvement in the result sought.

"It is estimated that only 15 percent of the total oil in the ground has been recovered or is recovered under present methods. At that time in the future when our domestic deposits of petroleum do become insufficient to meet our needs all those sources of future supply which you have enumerated will be extremely valuable to us. Certainly the reserves of petroleum in those unexplored areas of the two southern continents, South America and Africa, will do much in sup-

plying the world's future needs, including those of the United States. It is certain that in the exploration work done already in these continents and in Central America large deposits of oil have been located which will not be opened up until economic pressure or future demand makes development necessary.

"Similarly the shale oil deposits of the United States; it has been estimated that the oil contained in these deposits exceeds by many times all of the oil reserves known to have lain beneath the ground. Already commercially successful methods of refining shale oil have been developed. These methods will be improved as economic pressure demand it. The pioneering work done by Dr. Alderson, of the Colorado School of Mines, and by Catlin in the development of the Catlin process and more recent Trumble process are all beacon lights in the future refining of the huge shale deposits. This, of course, is a question of research and economic pressure making a market for this product.

"The coal distillates certainly offer a field for their development as is shown in the increased use of benzol and similar coal distillates in present day motor fuel.

"The research work in organic distillates is approaching the development of a motor fuel either direct or by blending with petroleum products. As scientists continuously experiment in the field of organic distillates and in the field of distillation of petroleum products the two dissimilar fields more and more approach each other. There has been of recent months experimental production of certain types of alcohol as by-products of petroleum distillation. Similarly in organic distillation there is a closer and closer approach to a fuel which is heavy enough to meet our internal combustion engine needs.

"Under the suggestion of a reduction of waste in production, transportation, refining or distribution of petroleum, it is our feeling that this is a field which offers little real opportunity for suggestion from those outside of the industry. Certainly the avoidance of waste is desirable but the waste which has been evident in the production of oil has been due to the exigencies of development of new fields. It is apparent that this is a field of improvement in which the industry itself is most anxious to serve.

"There should be no reduction of exports of domestic crude petroleum and its products. All of those suggested plans which would restrict the development of this great industry would defeat their own ends. The substitution of coal for fuel oil should be encouraged under those circumstances which make it of economic importance to the individual user.

"The introduction of more efficient

types of internal combustion engines is, of course, to be desired and this is certainly an end toward which the engineering profession is constantly working. There have been, for example, repeated attempts to develop a kerosene-burning steam small cylinder automobile engine. These have worked successfully. Two or three of them are on the market now but the public demand simply will not support the business. Certainly people should not be legislated into using them.

"The suggestion of increasing the total recovery of petroleum from the ground is a field in which large development is possible. In the Bradford field in Pennsylvania and New York, for example, where it was estimated that only 15 percent of the oil had been recovered, under one system of flushing these oil sands with water an increased recovery has been had which it is hoped will ultimately reach 65 percent of the total oil in the ground. The use of oil for domestic heating or for generating steam certainly should not be discouraged. It should be fostered and urged by all development which meets economic needs, but not to the disparagement of other fuels.

"The consideration of elimination of waste in retail distribution really has no relation to the primary problem which is our reserves of petroleum. It may or may not have a relation to the price which the consumer pays for petroleum products. There has been a great deal of discussion about the elimination of the middle man in our economic structure for the last few years. Where this middle man has been eliminated, between the producer of food products and the consumer, for example, we have noticed no diminution of price to the consumer. The result has rather been beneficial to the producer, and where this is necessary it should not be decried. Since the development of the citrus fruit associations, we have noticed no lowering in the price of citrus fruit. On the contrary, their price to the consumer has increased. The important thing in this industry is that the price to the producer has materially increased. The large number of roadside filling stations are in the great majority owned by the big refining companies. The diminution of their number or a restriction of their competition would not result in a benefit to the consumer. It might result in a financial benefit to the producer. This result we do not believe would be exactly popular with the public.

"The underlying causes of the more or less temporary periods of overproduction in petroleum are due to—

"First, the adventurous spirit of exploration, especially possessed by the American people which has made the development of the petroleum industry

possible and which continually goes exploring in new fields; and

"Second, the good fortune which sometimes attends those efforts.

"We have reached a continually increasing storage capacity in the country which now is close to half a billion barrels. Large reserves of raw material or refined products in such storage are, of course, a threat overhanging the market and keeping down the prices to the detriment of the producer and refiner.

"Only those very strong forces in the industry could afford to cooperate with the Government in the setting aside of drilling areas for future production. Certainly the driller or exploration company whose returns must come from his expenditure cannot, after he has spent his money to develop and test out a field, afford to join with the Government in setting aside it for production at some future day. Again the question is whether such a policy would meet with public approval.

"It is observed that the oil industry is seriously joining in the thought on the problems which you are considering which shows how fully its responsibility to the public on these matters is realized. The responsibility of the public is less clearly defined. We are frank to say that we do not know exactly what it is. Certainly the public interest in the matter is 99 percent based on the price that it pays for petroleum products.

"All nationals should stand on a parity in the development of new oil fields. Whatever international agreement would foster such development should certainly be encouraged. The nationals of all countries should be on an equal footing in their efforts for the exploration and the discovery of oil. The whole problem of future production, distribution and use of petroleum sums itself up into three phases:

"First, economic. The industry will develop, as it has in the past, where economic pressure forces it to develop. The substitutes for petroleum, for present-day engines, for present-day production and consumption of petroleum will be developed as economic necessity demands and makes possible. Full play should be given to all economic factors without the restriction of legislation.

"Second, research. The utmost intelligent efforts should be devoted to all problems of petroleum production, refining and use through a nonpartisan but commercial research body, fostered and encouraged by all the oil interests acting in unison; and

"Third, exploration. Development of all petroleum reserves in the world by all the nationals of all countries without restrictions.

"And finally let us permit posterity to

build on our achievements and developments.

"Very sincerely yours,

"THE AMERICAN MINING CONGRESS,

(Signed) "J. F. CALLBREATH,  
"Secretary."

## U. S. CHAMBER OF COMMERCE ANNUAL MEETING

THE Chamber of Commerce of the United States will hold its Thirteenth Annual Meeting in Washington, D. C., May 20 and 21.

In announcing their group meetings, of which there are eight, including Civic Development, Domestic Distribution, Finance, Foreign Commerce, Insurance, Manufacture, Transportation and Natural Resources, they point out that: "The Natural Resources Production Department, dealing as it does with agriculture, coal, forests, oil, minerals and the whole field of primary production of commodities and power, is forced to select a few from a wide variety of interesting and important problems. This year's group program will pay particular attention to agriculture, dealing with cooperative marketing and development of large scale production in agriculture.

"The coal situation will come prominently before the Thirteenth Annual Meeting of the Chamber of Commerce of the United States to be held at Washington May 20, 21 and 22. It will be taken up at a group session on the first day of the meeting, a session devoted to natural resources.

"The industrial user of bituminous coal has given little to the subject of coal since the fall of 1922 when the six months' strike in the bituminous coal industry was settled," says another statement by the chamber. "He has had a constant supply at a low price, and so far as he is concerned the coal industry is functioning properly.

"To those familiar with the problems of the industry, however, a different picture is presented. The industry is experiencing one of the worst depressions in its history, the effects of which if continued must lead to far reaching readjustments. All business is interested in this industry which is valued in excess of \$7,000,000,000, which employs more than 700,000 and which provides the public with a basic commodity.

"The coal situation will be presented to the group meeting by T. M. Dodson, vice president of the Pittsburgh Coal Company of Pittsburgh. In addition to a life-long experience in producing and distributing both anthracite and bituminous coal, Mr. Dodson is an acknowledged thinker on the broad aspects of business, especially the economic relationship of the coal industry to industry in general."



## MECHANICAL VS. HAND LOADING

(Continued from page 212)

use of mechanical loading will be confined to certain favoring conditions and in most mines therefore more or less modification of the standard methods will be found necessary.

Continuous loading by machine also requires continuous transportation of the coal loaded. Here the old method of placing one car at a time at the loading place fails and some new transportation system must be devised. Possibly some method for placing mine cars at the loading machine can be satisfactorily provided under certain conditions, but it is highly probable that conveyor transportation will be found more suitable and efficient. The conveyor idea is continually gaining favor and this method may be used to carry the coal from the loading machine to a point where an entire trip of mine cars may be loaded at one time or, if desired, the conveyors may be extended through the mine to the tipple.

When we consider, therefore, the wide range of mining conditions and requirements that mechanical loading must satisfy it is unreasonable to suppose that any one standard method or system will ever be devised. Therefore, each mine is a problem in itself, or at least each typical condition will require its own solution. It is well to emphasize this point and to realize that each mine, in determining its own method, can profit by the experience of others only to a more or less limited extent, which will be determined by the similarity of their natural mining conditions.

## LOADING IN THIN VEIN COAL MINES

(Continued from page 213)

This, in addition to the fact that the coal got down to 4 feet in thickness, in which the machine would not work successfully, proved to us that the machine was not suitable for the conditions in our mines. But it may be a success if operated in a seam 4½ feet or over in thickness.

During this experimenting I had visited different loading equipment which was being tried out but none of these machines was suitable to our conditions. I had up with different manufacturing companies the question of making a conveyor that would lay flat on the bottom. We were unable to get any company interested in making such a conveyor until about one and one-half or two years ago when I got the Chief Engineer of the Mining Department of the Jeffrey Manufacturing Company, Mr. Levin, interested in such a conveyor. The result is that the Jeffrey Manufacturing Company made this conveyor for us and we have

been experimenting with it for the past six or seven months. The conveyor is in 10-foot sections, so it can be lengthened or shortened as the case may be.

During this time we have removed several room pillars, these pillars being from 70 to 100 feet wide. We have been able to maintain the face by using three rows of cribs always removing the row of cribs next to the gob and placing them next to face after cut has been loaded out.

In using this conveyor it is, of course, necessary to undercut the coal and by using an ordinary shortwall machine we found that it took up too much room between face of coal and conveyor, as it required 6 or 7 feet of room. To overcome this difficulty we replaced the shortwall machine with a longwall machine which requires only 30 inches space between the face of coal and the conveyor. This allowed timber to be placed within 6 feet of face when loading coal, much closer than can ordinarily be placed by hand loading. Therefore, it was a great improvement in the operation of the machine.

Notwithstanding the great care we employed in keeping timber close to face, we did have considerable trouble with slate in some of the places. This slate came down with the coal, and retarded the work of the conveyor, although in designing the conveyor we kept in mind the necessity of cleaning the impurities from the coal at the working face. This can be done as the conveyor is less than 18 inches high, allowing a workman to kneel on the conveyor to pick refuse and throw same behind him in the gob.

This machine is working in coal 3 feet, 4 inches thick and we feel that we have made a slight gain over hand loading although it has been working where the conditions were very bad.

When the roof is good and no slate comes with the coal when it is shot down, we feel that the conveyor should be able to take two cuts from a 75-foot face of 4-foot coal in eight hours with nine or ten men including motorman and brakeman.

The coal from the face conveyor is delivered to sectional room conveyor which carries the coal to the entry where it is dumped into the mine car. The delivery of cars is easily taken care of, as a train of empties can be kept along the entry, and the change made 10 or 12 cars at a time instead of one car.

In addition to loading pillar coal mechanically, we felt that it was necessary to drive narrow work quickly in order to get development when needed.

On one of my trips to the Jeffrey factory during the process of developing the conveyor loaders, I saw a loading machine on their factory floor that had been designed for high coal and, as the

main body of the machine was only 34 inches high, I suggested a few changes to the machine such as conveyor and other parts so that its total height would not exceed 34 inches. The Jeffrey Company made the changes on the machine and we also have it in our mine experimenting with it.

This machine undercuts as well as loads the coal, and where top is good it should get from six to seven cuts of coal from an entry 12 feet wide, coal 4 feet thick, in 8 hours, each cut 5 feet 6 inches to 6 feet deep.

This machine has been working in a place where from 6 to 8 inches of slate comes down with or shortly after the coal is taken out. This makes the progress much slower; in fact, three or four cuts is a day's work and in such cases there is no saving over hand loading.

The coal from this cutting and loading machine is delivered to a sectional conveyor as in pillar work. The conveyor being alongside of the entry, a train of cars is placed in the entry along the conveyor. A short conveyor is used to divert coal from the sectional conveyor to mine cars. This makes the delivery of cars much more convenient than supplying them one at a time.

This machine breaks the coal much more than hand loading but in good conditions this breakage will be offset by the amount of entry that can be driven per shift.

## LOADING IN METAL MINES

(Continued from page 214)

The use of scrapers in underground loading processes is also given much space. Detailed descriptions of underground loading devices employed in numerous metal mines are given. Copies of this bulletin may be purchased from the School of Mines and Metallurgy, University of Missouri, at Rolla, Mo., at a price of \$1."

According to the Interior Department contributions amounting to \$50,000 have been made by American Indians toward the construction of an immense athletic stadium at Haskell Institute, an Indian Government school at Lawrence, Kans.

The proposed structure, which, when completed, is expected to cost approximately \$125,000, will be built exclusively from subscriptions by Indians. This is the first time that the Indians have joined in an enterprise of this character.

A society is being organized in South Africa to foster development of the oil industry. Its organizers are mainly interested in oil shale development, and one of their main objects will be to keep before the public the necessity for some form of local supplies of gasoline or gasoline substitutes.

## LEGISLATIVE FORECAST

*While Congress Is In Recess, Interest Is Centered On Its Reconvening Next Fall Or Winter—Preparations For The Session Are Being Made, With Indications Of Chief Interest Being Centered On Tax Revision And Government Economy*

**T**HE general trend of public opinion seems to indicate that the country is still enjoying its respite from congressional activity, and that there is little enthusiasm for any possibility of an extra session of the 69th Congress. However, slowly there is crystalizing public thought in regard to the possibilities for legislation when Congress does convene. Investigations of the various congressional committees are well under way, and their conclusions and recommendations are expected to be the basis for much of the legislation to be proposed next Winter.

Outstanding in importance to the citizen taxpayer is the possibility that taxes will again come down. Although the 1924 revenue law is still a lusty infant, it is expected that he will be eclipsed by a new arrival early in 1926. This condition arises from the fact that with constantly declining Government expenditures under the concerted economy drive of the President, the present tax law yields more revenue than is necessary to meet Government expenditures. The process of curtailing Federal outlay of money is continuing and will be continued during the next four years in the hope of bringing the Government expense account down to an irreducible minimum.

Detailed studies of the present tax law and its effect on business are already being made by officials of the Treasury Department with the view of presenting to Congress suggested reduction in tax rates and revision of administrative provisions. Members of the House Ways and Means Committee which will draft this legislation are already giving personal consideration to tax revision and the chairman of the committee, Representative William R. Green, of Iowa, has gone to Europe to study the tax systems of those countries with the view of incorporating into the new tax law such provisions as will perfect the revenue producing system. This committee is expected to give actual consideration of the bill next September, when hearings will be afforded to persons desiring to present their views. Should the bill reach such a stage as to permit of its consideration before Congress convenes in regular session in December, the President may call an extra session to be devoted exclusively to consideration of this legislation.

### COUZENS COMMITTEE CRITICISMS

An interesting factor will undoubtedly be injected into consideration of tax

legislation by the special committee of the Senate which has been investigating the Internal Revenue Bureau and finding fault with provisions affecting the mining industry. This committee has taken considerable testimony in which agents of the committee have said that the mining industry has not paid full taxes because of excessive depletion allowances. This committee will conclude its investigation proper on June 1, and has until the next regular session in December to submit its report. Should there be an extra session to consider tax legislation, the committee is expected to bring in its report at that time as the basis for Senate consideration of the bill. As this committee has not allowed interested industries to reply to the charges developed during the investigation, it is expected such opportunity will be given by the House Ways and Means Committee and the Senate Finance Committee during the hearings on the bill. Because of the many issues involved the report of this investigating committee and its recommendations as particularly affecting the mining industry will be awaited with much interest.

Reorganization of Government departments in the interest of preventing duplication of work and tending toward economy in expenditure will no doubt be considered by Congress at next session because it will be the regular long session with no time limitation. Government reorganization was recommended in bills introduced during the last Congress but the short session prevented their consideration. These will no doubt be reintroduced, with modifications as developments require, and be pressed by administration leaders with the view of aiding the President in bringing about coordination of Government bureaus. The President has already transferred the Patent Office from the Interior Department to the Commerce Department, which plan had been embodied in the reorganization bill. Other Government changes, however, including the proposed transfer of the Bureau of Mines from the Interior Department to the Commerce Department, and the consolidation of independent offices into Government departments will be referred to Congress for action.

### POWER DEVELOPMENT

Development of the Muscle Shoals, Alabama, nitrate and power project will also be again before Congress. Although this matter was considered in committee and debated in the House and

Senate during almost all of the last Congress no action was taken and a committee has been appointed by the President to again consider the matter and to recommend definite action on the project. This committee is headed by former Representative John C. McKenzie, of Illinois, who was in charge of the bill during the last Congress as chairman of the House Military Committee.

Public land legislation also looms as a possible subject for congressional consideration next year. A special committee of the Senate is now investigating all questions affecting public lands and their administration with the view of recommending changes in the interest of the Government and land settlers and claimants. This will involve mining claims and rights of mineral claimants in the Western States.

### MUSCLE SHOALS COMMISSION

**F**ORMER Representative John C. McKenzie of Illinois has been named chairman of the commission recently appointed by President Coolidge to investigate and report on the most practical methods of utilizing the Muscle Shoals, Ala., nitrate and power project. Mr. McKenzie was chairman of the House Military Committee which considered this subject.

Other members of the commission are Former Senator Nathaniel B. Dial of South Carolina, Harry A. Curtis, professor of chemical engineering at Yale University, who recently conducted a world nitrogen survey for the Department of Commerce; William McClellan, electrical engineer of New York City, former president of the American Institute of Electrical Engineers, and, Russell F. Bower of the American Farm Bureau Federation, who has been making a study of this problem for some time.

W. E. Murray has been named secretary with headquarters in the House Military Committee at the Capitol.

Dr. Warren K. Lewis, head of the Department of Chemical Engineering of the Massachusetts Institute of Technology, in a recently issued statement, estimated that the value to be placed upon the oil shale lands of Northern Colorado would approximate a trillion dollars.

# THE NATION'S VIEWPOINT



*A Digest Of The Expressed Opinions Of Leaders In American Affairs*

**T**HE 68th Congress left an aftermath of some 1,000 national laws. There are many state legislatures in session at the present time, and, in practically each instance, they are determined that the National Congress shall not outdo them. *The New York Commercial*, in an interesting editorial on "Business is the Victim," points out that the present session of the legislature in Connecticut has introduced 1,600 bills, most of which are absolutely destructive in character and, if passed, would handicap the industries of that state to an extent equivalent to destruction. Their editorial follows:

"When will the public understand that the necessity of combating vicious bills of this kind constitutes an economic loss? That while their passage would be fatal, even their introduction means increased taxation and higher living costs. The expense to the manufacturers in attending hearings, getting out literature, assembling facts and figures, all must go into overhead, and eventually be absorbed in the cost of the goods to the consumer. Added to the above is the cost of the uncertainties occasioned by the fear that some of those bills will become laws. This affects capital, makes it timid, prevents planning for the future and puts further burdens on to the manufacturer.

"Furthermore, the cost of the legislature itself is translated into taxes the people must pay. It is estimated that the cost of this session of the legislature to the people of Connecticut will be around \$750,000—and most of the time of the legislators will be taken up in consideration of fool bills that ought never to have been introduced. If the legislature acted in a business-like way to consider only those essential things necessary to government, the length of its session would be cut in two—perhaps considerably more than that.

"The Connecticut Legislature is only typical of those in the other states. Taking Connecticut as the average with its cost of \$750,000 for a single session of the legislature—multiply this figure by 48 and you have the enormous sum of \$36,000,000 as an annual state legislative expense which the public must pay. And this does not take into consideration the administration expense of state governments—another staggering figure.

"If the public would only stop to think how laws increase state taxes there wouldn't be so many introduced. The number of bureaus, agents and employes for law enforcement and administration are mounting rapidly. Each new law means added expenses—added tax burdens. Isn't it time for some clear thinking on the part of the public?

"What we need are fewer laws and more law enforcement. Less state and national legislation—more local responsibility. With fewer laws care-

fully considered, backed by public sentiment, enforced as they should be, we shall have greater respect for and obedience to law."

*The New York Times* points out that Sir Henry Thornton is one of the few men who can discuss the relative merits of public and private ownership of railroads from a platform of absolute authority, based upon 20 years of service with the Pennsylvania Railroad, six as an operating executive in Great Britain and three as head of the Canadian National Railways. The following comment is made by the *New York Times* on the recent article by Sir Henry in *Collier's Magazine*:

"Sir Henry Thornton is one of the few men who can discuss the relative merits of public and private ownership of railroads with an open as distinguished from a vacant mind. Twenty years of service with the Pennsylvania Railroad, six as an operating executive in Great Britain and three as head of the Canadian National Railways and on the Continent during the war have brought him to this attitude:

"Starting in opposition to state ownership, I have come to the point where I am willing to let the facts of each case control."

"Discussing the matter in the current *Collier's* with a breadth of vision and a degree of candor almost new in this field, Sir Henry insists that under specified conditions either form of railroad ownership is bound to fail; that both have failed time and again and that the result of the breakdown of either form is resort to the other. There is, therefore, no absolute answer to the question, which is the superior as a social economic institution. In each case the verdict will be determined by the surrounding circumstances, just as all changes from one form to the other have resulted from a condition and not from a theory.

"Private ownership in Thornton's well-reasoned opinion is bound to fail if the eyes of the



N. Y. Evening Post  
No Rest for the Weary





Wallace Press-Times

Too Many Eggs in One Basket



New York Herald-Tribune

Working a Good Horse to Death

management or those who direct it are more firmly fixed on the stock market than on the service the road is rendering. It will fail also if public regulation reaches such a point that the managers can exercise but slight discretion in management. 'Excessive political regulation is only applying the worst features of state ownership to private ownership.'

"Public ownership, says the head of the greatest single government-owned system in the world, is bound to fail whenever politics enters into the management. If that can be prevented there is no reason why a government-owned system cannot be as efficient as any and, he declares, it has been prevented to date in respect to the Canadian National. Unquestionably the statement is true as far as it goes, but the Crow's Nest Pass muddle proves that the whole freight rate situation in Canada is in politics.

"Sir Henry has scant faith in 'civil service or other regulations to take the staff out of politics,' whenever a government-owned system is connected in management with the party administration of the day, as through a minister of railways. 'Such regulations either build up a stalwart bureaucracy which runs the railways to perpetuate the bureaucracy, or they merely cement time-servers to their jobs.'

"To citizens of the United States Sir Henry's discussion will suggest some pertinent questions. Could any sane man hope that in this country a

government-owned transportation system could long be kept out of politics? It is hard enough, in all conscience, to keep our privately-owned roads reasonably free from political meddling. It is not six months gone that we had to dispose of a presidential candidate running on his railroad-baiting record. Today the Commerce Commission is taking up an inquiry into the whole freight tariff structure, in compliance with a congressional resolution proceeding from a purely political motive.

"It is not clear that, in this country at least, the conditions which must wreck private ownership are avoidable, whereas those which must spell the doom of public ownership are inevitable?"

In an address before the Louisiana Bankers Association, at New Orleans, the Hon. Frank W. Mondell, of Wyoming, discussed the advisability of revision of our tax laws, pointing out:

"The old maxim which joins death and taxes as the inevitable twin evils serves as a forcible reminder that taxes are an unwelcome though unavoidable factor in the scheme of human affairs only to be justified when levied and expended wisely and equitably from the standpoint of the general public welfare.

"If methods of taxation are to be permanent they must be made to conform to the principles which govern sound tax policies. They must provide for contributions as nearly as

possible in proportion to the ability of the citizen to pay, and be actually productive in the entire field which they are intended to cover; they should not burden the taxpayer more than they benefit the Treasury, or obstruct industry, discourage enterprise or destroy initiative.

"This, then, is our present federal tax situation: At a time more than six years removed from the closing of the war emergency which justified temporary high tax rates the federal tax gatherer still collects as much as 46 cents on a dollar of income, and this while there are tens of billions of federal and municipal securities the income from which is entirely untaxed. When one of our citizens dies, leaving an estate sufficiently large to bring it within the highest of the tax brackets, his estate must pay to the Federal Government taxes which may reach a maximum of 40 percent of its value."

The call has been issued by James A. Farrell for the 12th National Foreign Trade Convention to be held at Seattle, June 24 to 26. In issuing this call, Mr. Farrell has pointed out many matters of great interest to the people of the United States, as, for instance, his statement that our annual production is \$70,000,000,000. In commenting upon these stupendous figures, the *Wall Street Journal* has the following to say:

"This, of course, is not news, but how many ever give thought to what is behind this enormous production,



what it is that holds it up and what would happen to our business if it should shrink in any considerable proportion?

"A high standard of living in the United States is due in great part to this large production. Specialization and division of labor are necessary for such a production as this. The result is an abundance of goods for all and an increase of purchasing power to enable the people to obtain the goods. The system that makes products abundant and relatively cheaper must give extensive employment to labor and, therefore, increase purchasing power and make possible the distribution of goods. In other words, this great production depends entirely upon consumption.

"But the people of the United States cannot consume all the goods they produce. Neither can they produce some goods necessary for their use. If they cannot consume all they produce they must either reduce production or find other outlets for their products. This is one province of foreign trade. It searches out world markets for our goods and brings back others necessary in our industry to satisfy needs and wants of the consumer. This trade, as Mr. Farrell points out, amounted to \$8,250,000,000 in 1924.

"But there is another thought of great importance in his call which the timid and the fearful would do well to ponder. Seldom, if ever, says he, have American foreign traders faced a more hopeful outlook than now. He finds a new assurance of stability and progress in Europe and says that

this current year promises to exceed that of last year, even though that amounted to the immense sum quoted. There is a realization also of the importance of the Far East and of the Latin American countries, and every phase of trading with these as with other countries is to be studied in the convention.

"When an experienced authority on foreign trade can see the dawn of better times in Europe, which now takes 57 percent of all our exports, as well as the prospects of enlarged trade in those countries that are far below European standards, it is time for all business interests to cooperate in furtherance of our international trade."

Public interest in the adventure of organized labor into the banking business has not waned. In a recent article, reported by John F. Sinclair, in the *Washington Star*, Warren S. Stone, of the *Brotherhood of Locomotive Engineers*, points out that this movement is vastly full of promise, saying:

"No economic development in the world is so full of promise as the entry of organized labor into the banking business. In a few more years we aim to have 50 or more cooperative banks in operation from the Atlantic to the Pacific. Our program is definite. It calls for the establishment of new banks only as fast as we can obtain competent men to run them. We are likewise establishing regional corporations which will act as holding companies for the individual banks in their districts. And the whole system will be headed up in an Ohio corporation which will control the regional holding companies. Our organization, of course, controls the central

company and our officers are officers in it as well as the subsidiaries.

"In my opinion, organized labor in the United States has gone through three cycles. In the first cycle, class consciousness was the key word. A sense of solidarity, of unity, was necessary in order to make a collective effort for better wages and better working conditions. Our own brotherhood passed through this cycle quickly and successfully.

"In the second cycle, there developed a struggle to maintain the principle of collective bargaining. This was a disturbing, unsettled and very unsatisfactory period. It involved, I am sorry to say, the use of force, sometimes economic, sometimes physical, on both sides. To me this principle of collective bargaining has now won its legitimate place in American life.

"Then comes the third cycle. It lies in constructive development toward a system of cooperation, rather than the warpath. And the most striking evidence of the stage is the labor banks.

"Today the 28 labor banks in America have combined resources of more than \$150,000,000. These huge resources have been built up in less than four years. How? If labor banks are the workers' banks, then the workers could share in their earnings. To us this is a basic principle. We believe stockholders in a bank should be satisfied with a maximum return of 10 percent on their money. All over that, after carrying charges



The Great American Game Seems to Have Become Internationalized

and reserves, is prorated among the savings depositors in proportion to their deposits. And so in the past three years we have paid 4 percent compounded quarterly and in addition a special dividend to savings depositors of 1 percent each year.

"Of course, there will be many problems constantly coming up for solution which deal with hours of labor and wages. But I hope that the business men of America will assist labor to pass through the second stage of industrial development—that of recognizing the rightful place of collective bargaining. We believe the employer and employe should collectively settle all disputes about pay and working conditions.

"As soon as the labor movement, as a whole, enters the third cycle in its development, capital and labor for the first time in history will join hands in building railroads and utilities and mines and factories by the joint effort of each other's labor."

The recent determination of the Interstate Commerce Commission to make a complete investigation into the freight rate situation has been of vital interest to industry at large. M. H. Wilson, Vice President of the Brookmire Economic Service, in the Monthly Review of the American Metal Market points out:

"Every business man is deeply interested in the question of freight rates. He is equally concerned with the question of transportation—

prompt and careful delivery of the goods which he purchases and those which his customers purchase from him. The desire for lower freight rates is a natural one, but it is well to consider some of the probable effects of lower freight rates upon the transportation system of the country.

"The expansion of the transportation system of the country during future years is, obviously, essential to the business man. Such an expansion will require capital in large quantities.

"Distribution, not production, will be the greater problem during the next 10 years. The ability of farm, forest, mine, and factory to produce is very large at present and can readily be expanded. That productive capacity can successfully be used only to the extent that distribution is perfected, and in any comprehensive plan of distribution the steam railroads are an essential part.

"Adjustments of the rate structure must be made from time to time—scientific revisions of various schedules, based upon the careful study of the problems of the railroads, of the other industries, of the sections of the country. But the policy advocated by many persons, for the lowering of all freight rates will, in the end, prove disastrous to the business man. Efficient transportation is essential for him."

The tariff issue is again to the forefront, and as the mining industry furnishes many major items of the present law, mine operators find food for thought in editorial comment upon this subject. The April 18 issue of *Engineering and Mining Journal-Press* has the following to say concerning the tariff upon and the taxation of minerals:



Wallace Press-Times  
S'Too Much—S'Too Much

neering and Mining Journal-Press has the following to say concerning the tariff upon and the taxation of minerals:

"The tariff on the importation of foreign goods into the United States has, as is well known, two functions. One is to raise money for the cost of government; and the other is, by varied and discriminatory rates, by putting high duties on some things and letting others in free, to help the economic position of the United States. American industries are thus (in theory) protected against too severe competition from similar industries abroad; while materials which are needed in the United States, and which we do not produce in quantity, may enter free. There are exceptions and evasions of these principles, but, nevertheless, they are the bases. In effect, the tariff is a discriminatory tax, for revenue and for promoting the prosperity of industries that need protection; it is a tax levied at our frontiers on imports.

"The proceeds from this tax are not enough to run the Government, so we have a variety of internal taxes—federal, state, county, and municipal. Some of these internal taxes are also discriminatory—there are special taxes on tobacco and other luxuries; also on iron mines in Minnesota. The first is based on the theory that a tax may be paid on luxuries without interfering with economic prosperity; the second is socialistic, on the theory that the ore deposits belong to the state; and, since they are being exhausted by being worked, the special



Dallas News  
Sure Tasted Like More



tax is exacted by way of a depletion fund for the state.

"The various mining industries are among those American industries which should receive the thoughtful and favorable care of the government to a greater extent than they have had it heretofore. The protection of a preferential tariff in varying degrees has been extended to many mineral industries, such as lead, zinc, manganese, magnesite, and many others. Some of these tariffs have effectively fostered the industries for whose benefit they were imposed; others have proved ineffective, for various reasons. But there are many industries, mining and others, which cannot be fostered by the tariff. Industries producing commodities of which we have an exportable surplus, like copper and zinc, cannot maintain the tariff differential, or, indeed, any differential, from the world price in the price of their products. The tariff on wheat and other farm products proved a dead letter for the same reason; and the farmer and his many friends are now seeking frantically for some other form of economic assistance and other preferential treatment.

"Under these circumstances, if the discriminatory tariff tax fails to help, why not a graded discrimination in internal taxes? This would give the desired assistance and would be no different in principle, and would work no greater hardship against the unfavored than the discriminating frontier tax. We recommend this idea to the copper producers as a more practical one than a tariff on copper.

"Finally, there is the American gold industry—a valuable and essential one, which is clearly and definitely on the down grade. Yet the federal, state, and municipal governments continue to tax the industry with unrelenting zeal. If the industry is worth saving, why not use reasonable moderation in the blood-letting? When the mine is closed, the taxes might keep the mine running and still yield more to the cost of government than a dead mine could do."

Urging the United Mine Workers' organization to get back upon the broad-vision platform which resulted in the establishment of the eight-hour work



Adopting a Family

day, *Coal Mining Review* in a recent editorial points out that:

"The eight-hour work day became effective in the bituminous coal industry of the central competitive coal-producing states, April 1, 1898. Eight hours is the established work day in every coal-producing district, anthracite and bituminous, in the United States. It is conceded the establishment of the eight-hour work day in the mining industry, on April 1, 1898, was the greatest achievement ever accomplished in behalf of the mine workers of the country. The achievement was all the greater as it was not won by a strike, nor as the outgrowth of a strike in the coal industry. The eight-hour day was not conceded by the operators of coal mines on account of the power of the United Mine Workers of America to establish this great reform even by the threat of a strike.

"It was not the power of the United Mine Workers' organization that induced the operators to agree to an eight-hour work day. It was the recognition by the operators of the justification of the claim of the miners' representatives that eight hours' labor in the mines was a reasonable time for men to work. It was definitely agreed the miners were to be at their working places during the full eight hours, exclusive of the noon hour. From that time until the eight-hour day was established in every coal-producing district of the country, there is not a single instance where the shorter work day has been

established by a strike. If the leaders of the mine workers at the present time were guided by the same sense of justice as prompted the operators in 1898 to concede the eight-hour work day, an effort would be made to solve the complicated problems of the industry in an intelligent manner and concede justice to the operators.

"The leaders of the United Mine Workers should give more consideration to what has been accomplished by conciliatory methods of the operators and miners in the early history of the organization. The present policy of the United Mine Workers' organization is not in harmony with the policy of the organization and its leaders when the joint conference of operators and miners met in Chicago in January, 1898. The leaders of the United Mine Workers should consider the effect of the present policy of the organization.

If they do, they cannot help but realize the organization is gradually crumbling and losing its power and prestige as an institution to protect the rights of the mine workers of the country."

The Jacksonville agreement and Government responsibility therefor is a topic of never-ending speculation. In the April 16 issue, *Coal Age*, in an editorial entitled "A Triumph in Surgery?" makes the following comment:

"Washington, with characteristic great-hearted fortitude in the face of the sufferings of others, continues to disclaim responsibility for the torments of the operators who signed the Jacksonville agreement. Government officials profess to be unimpressed by suggestions that Washington take the initiative in urging an orderly revision of the contract. They seek refuge in the contention that the agreement calls for 'a major surgical operation without an aesthetic' and, inferentially, express mild surprise that there should be whimpers when the surgeon's knife is plunged into the conscious patient.

"The figure drawn from the hospital ward carries implications that may scratch political complacency as well as gash the coal trade. It raises anew the question of the diagnosis of the ills of the industry and the efficacy of the treatment prescribed. When the pact was first signed it was acclaimed as a certain purgative of debilitating overdevelopment. The excess, the uneconomical, mines were to be driven out of business; the un-



Bigger Than the Law



The Fairmont Times

Seems Like the More He Eats the Thinner He Gets

necessary miners were to be absorbed into other industries and their fellows who remained were to be transformed from part-time to full-time workers. The devastating expansion in bituminous mining was to cease—a highly beneficial system of birth control was to be enforced by the inexorable logic of events. From the pills and potions, the purges and the blood-lettings, was to emerge a convalescent bituminous coal mining industry, clean, lean, vigorous—a credit to itself, the Nation and the political doctors who called the ambulance.

"How does the condition of the patient today compare with that picture? If there has been any wholesale abandonment of properties where current costs of production have been out of line, the secret has been amazingly well kept. Mines in the union fields have been shut down, consolidations have been effected, but little has been done to reduce the potential production capacity of those operations. There is every probability that the majority of the mines now idle will start up again at the first favorable opportunity. The present plight of the union mines, however, has been a spur to nonunion expansion. If a survey were taken, we should find more—not less—mines in existence as the result of one year's working of the Jacksonville agreement.

"That conclusion seems to contradict the promises made in 1924. But possibly the lay mind has misinterpreted the diagnosis of the skillful politician practitioners who make

Washington their home and the economic welfare of the country the unrelieved patient of their clinics. Union mine development is at a standstill; nonunion expansion has been encouraged. Can it be that those who urged agreement upon union operators and union leaders a year ago had a deeper purpose in mind than appeared? Was the suggestion a subtle antitoxin to destroy the power of union labor in the mining industry? Certainly the developments of the past twelvemonth do not conflict with such a conjecture.

"If such be their cryptic purpose, their unwillingness to permit the Government to be a party to any movement which would undo what they have so assiduously and cunningly labored to bring about becomes understandable. Perchance the operators who condemn Washington do it a grave injustice in failing to appreciate its Machiavellian benevolence. Surely a genius that persuaded the leaders of the union to become partners in a plan to undermine their own organization, and is so potent that these same leaders still work loyally to make the plan successful, ought not to go unrecognized."

In the minds of many publications the word "chaos" is synonymous with coal. In an editorial in a recent issue, *Coal Mining Review* points out that now is the time for a calm deliberation, saying:

"Time for calm deliberation—

"If the coal mining industry is to be saved from the chaos into which

it was plunged by reckless and destructive competition which developed in the years of 1896 and 1897.

"If hundreds of operating coal companies are to be saved from financial ruin brought about by needless but reckless and destructive competition for a market that cannot absorb all coal produced.

"If thousands of mine workers are to be saved from distress and possible suffering brought about by a policy which has caused the overdevelopment of the coal industry and induced thousands of men to seek employment and be employed in the coal mines.

"If a mutual feeling of respect for each other is to be reestablished between the operators and mine workers of all coal-producing districts, which is necessary before any plan can be made effective to banish strife and strikes from the coal mining industry."

Emphasizing that the right sort of cooperation will be the salvation of the bituminous coal mining industry, the *American Coal Miner* editorially says:

"The sort of cooperation that is needed in the bituminous coal mines of these United States is not of the brand that would give to certain operators distinctive advantages in the matter of costs at the expense of the wage rates provided in the Jacksonville wage agreement.

"Intelligent cooperation must be predicated on progress—any other plan, any other scheme, that would destroy present-day working stand-



New Orleans Times-Picayune  
Hastening to Recognize Bolshevik Russia

ards to the detriment of any branch of the industry would not be cooperation at all; it would simply be a concession that ultimately would flare back to the detriment of the temporary benefactor.

"The kind of cooperation that is needed is that of intelligent application of the usage of tools and devices in the operation of the mines. The promotion of efficiency in underground transportation and in the assignment of underground work. It means more intelligent and closer supervision of the work by the mine management. It means the substitution of modern engineering practices for the rule of the thumb methods now in vogue in the great majority of bituminous coal mines.

"Concessions designed to prolong the life of uneconomic mines and continue their production in competition with the more modern plants means a backward step.

"The old hit and miss mining methods have passed, never to return. Some of the alleged wise men of the industry do not seem to realize that such is the case, but it is nevertheless true.

"Until operators take an inventory in accordance with the rules of the new order of things they will remain out of the running.

"Verily, there is but one plan of cooperation that can be used in the bituminous coal industry and that is intelligent cooperation in mine management."

Attorney General John G. Sargent already has made a deep impression upon

his policies will be those of his predecessor, Justice Stone of the Supreme Court. With respect to the antitrust laws, the new Attorney General will prosecute to the fullest extent all actual violations of the statutes.

"In asserting this, Mr. Sargent wanted it made clear, however, that he did not propose to have the machinery of his department used to harass any business. In this he is reflecting the ideas of President Coolidge, who repeatedly has said that big business was not bad because it was big, and that the requirements of the age demanded big organizations of capital, properly conducted.

"Ten antitrust cases were pending in the Department of Justice, Mr. Sargent said, and 20 investigations into complaints of violations of the trust laws were under way. The cases actually before the department will be pressed to a conclusion and the inquiries being conducted would be carried on until it is determined whether complaints were justified."

The late Senator W. A. Clark in his will made special conditions surrounding the acceptance

American business. In discussing his policies in conducting the Department of Justice, the *American Metal Market* says:

"Big business which is conducted within the law will have nothing to fear from the new Attorney General as long as it stays within the law. His office will not be used for 'fishing excursions' into the realm of business or to keep organized industry in a turmoil.

"Primarily, with respect to 'trusts' and prohibition,

of his gift to the Metropolitan Museum of his wonderful collection of paintings. *The New York World*, in commenting upon this, says:

"If former Senator W. A. Clark had bequeathed to the Metropolitan Museum only his 22 Corots, or his 22 Monticellis, or his Persian rugs and carpets, or his Bernard de Palissy pottery, his gift would at once be gratefully accepted. . . . It is the wealth and variety of the material he had gathered together for his own enjoyment and planned to pass on to the museum that cause the trustees embarrassment in deciding what shall be done. For apparently they hold themselves subject to a system of classification and display that does not admit of the carrying out of the donor's conditions that the Clark collection as a whole be housed in a separate gallery. . . .

"It is an immensely valuable gift, that must be accepted or rejected on fixed conditions. . . . What matters is that the museum trustees shall find a way, as lies in their power, to take over the Clark collection. Its loss would be irreparable, and solely because of their action."

A bill before the recent Sixty-eighth Congress provided for the study of the Constitution in the schools of the country. The bill met with considerable opposition. The Hon. Hatton W. Summers, member of the House of Representatives from Texas, said in opposition to the bill:

"I agree that there is nothing more important than to have the youth of the land and the citizenship of the country generally made familiar with our system of government, its nature, its origin, its development, the rela-





tionship which each unit of government sustains to the other units of government, and the relationship which the private citizen sustains to the whole system.

"It seems to me clearly that the inevitable effect of this resolution as it is drawn would be to increase the tendency toward federal concentration.

"But I do not believe there is a single student of the conditions that obtain in the American system of government today who does not realize that the time is at hand when we must begin the decentralization of the governmental power and responsibility. We are destroying the efficiency of our system of government at the federal end by the overload of governmental responsibility.

"Each day we are making our system of government more bureaucratic because the total of governmental responsibilities concentrated here is beyond the capacity of the Federal Government to discharge, functioning under popular control. Day by day this great governmental system of ours is becoming more and more bureaucratic because this overload of necessity is shunted out to bureaus created to take care of the overload. This is not a matter of theory or of speculation; it is a known fact.

"Today we are undertaking to operate this great system of government of ours from the top downward, when by its nature it must function from its bottom upward."

The continuous hew and cry urging "taking the government out of business" will lead to both advantages and disadvantages. As pointed out in a recent editorial in the *New York Times* the pendulum may swing the other way. It points out that there is a distinct tendency to make the central government keep its hands off so that localities and individuals may be more free to put their hands on, and, further, that—

How long this lurch away from excessive use of governmental agencies will continue no man can say. Public opinion has queer ways of doubling on its own trail. But if the movement spoken of gains or holds headway for a few years, there are certain results from it, or dangers involved in it, which must be kept constantly in mind. For one thing, new responsibilities will be thrown upon the states.

They will have to undertake themselves work which they are not at present willing to impose upon the federal authorities.

No protest against centralization is of much avail unless it is accompanied by a promise to make the local government self-determining in fact as well as in theory.

The drift against undue governmental meddling with private affairs is commonly described as in favor of a larger individualism. We are told that private enterprise will now have a free course to run and be glorified. Predictions of a great industrial expansion in this country are partly tied

demands rightfully made upon the possessors of great influence.

Individualism must prove that it can confer greater boons upon the commonwealth than can stateism, otherwise the pendulum will swing backward faster than it has swung forward.

## PERMITS TO MINE POTASH

PERMITS and leases to mine potash on the public domain total 483, covering 1,092,873 acres up to March 23, 1925, according to a tabulation just completed at the Interior Department.

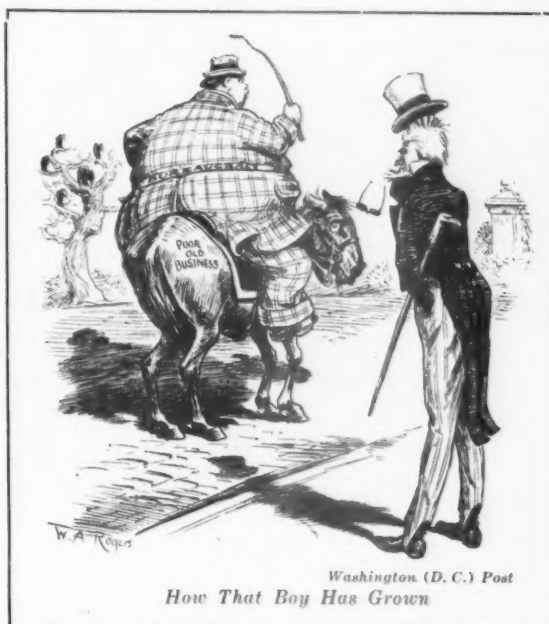
The terms of these permits and leases provide for an initial investment of approximately \$2,926,000, and the payment of a royalty to the Government on all potash produced.

Of the various states, the largest number of permits and leases have been issued on the public lands in Utah, the total being 302. California comes second with 83, and Nevada third with 72. A list of the states with the number of potash permits and leases follows: Arizona, 4; California, 83; Colorado, 3; Idaho, 1; Montana, 2; Nebraska, 4; Nevada, 72; New Mexico, 10; Oregon, 1; Utah, 302, and Wyoming, 1.

The tabulation also shows that 40 permits for the mining of sodium have been issued by the Interior Department on approximately 60,000 acres of public land, as follows: California, 5; Nevada, 27; New Mexico, 3, and North Dakota, 4.

An oil shale lease involving 1,920 acres of public land in Idaho and requiring an initial capital investment of \$100,000 and a phosphate lease covering 360 acres in Wyoming requiring a capital investment of \$35,000 complete the list, in addition to the payment of royalties to the Government.

The largest railroad undertaking in the world, according to the *London Times*, is the new German railway company, the *Reichseisenbahn Gesellschaft*. It employs three-quarters of a million men, as many as all the English companies put together. It operates 33,000 miles of line—half as many times again as the next longest system, the Canadian National. Its nominal capital, £1,300,000,000, is far and away the largest. Its annual revenue of over £200,000,000 is about 40 percent more than that of its nearest rival, the Pennsylvania Railroad.



Washington (D. C.) Post  
How That Boy Has Grown

up with the belief that the government is to do less and less interfering, and that there will be a great release of individual energy. This may well occur. But here, too, a serious responsibility goes with the power. It behooves all who are rejoicing in the change we have noted, and preparing to take advantage of it, never to forget the new duties which the new age teaches. If the country finds that limiting the functions of the general government means the creation of haughty and greedy corporations, defiantly asserting that they may do what they will with their own, the swing back to rigid government control will be rapid and remorseless.

The free play of private initiative and the unhampered development of our resources and our industries are splendid things for the nation, but always provided that those directing them and benefiting by them remain alert to the social and public-spirited

## BAUXITE IN 1924

THE production of bauxite in the United States in 1924 was 346,553 long tons, valued at \$2,131,908, a decrease of 34 percent in quantity and 32 percent in value as compared with the domestic production in 1923, according to a statement issued by the Department of the Interior, prepared by James M. Hill, of the Geological Survey.

*Bauxite Produced In The United States  
In 1923 and 1924, In Long Tons*

Year	Domestic Production	Imports	Exports*
1923.....	522,690	119,020	78,560
1924.....	346,553	201,974	77,065

\*Largely bauxite concentrates.

*Domestic Bauxite Sold By Producers To  
Industries In 1923 and 1924, In  
Long Tons*

Year	Aluminum	Chemicals	Cement	Total
1923.....	380,520	68,870	73,300	522,690
1924.....	225,774	53,859	66,920	346,553

The production of bauxite in the Arkansas field was 326,616 long tons in 1924, a decrease of 167,264 tons as compared with 1923. The eastern field decreased its output over 8,000 tons, the production in 1924 being 19,937 tons from Georgia and Tennessee. No bauxite was produced in Alabama in 1924. The imports of bauxite in 1924 were 201,974 tons, an increase of about 70 percent as compared with 1923, most of which came from the Guianas, South America, though some French and Dalmatian bauxite was received.

Announcement is made by the American Metal Market of the release of their 1925 edition of "Metal Statistics." According to their statement, "Metal Statistics" contains all the useful and authoritative iron, steel and metal statistics relating to production, consumption, imports, exports, stocks and various other data that is valuable to those who desire a complete and accurate knowledge of important market and trade information. Those who are interested in interpreting various statistical movements of the iron, steel and metal markets will find "Metal Statistics" a very valuable reference book.

"While previous editions have been regarded as complete, 'Metal Statistics 1925' contains many new tables and statistics and covers even a wider scope than any of the previous editions. The statistical information answers every practical requirement."

The price is \$1 per copy and may be obtained by addressing the publisher at 11 Cliff Street, New York City.

## LEAD IN 1924

THE production of refined primary lead in the United States, as compiled by T. C. E. Siebenthal and A. Stoll, of the Department of the Interior, Geological Survey, has just been announced, showing (in short tons):

	1922	1923	1924
Domestic desilverized lead.....	185,191	291,760	299,343
Domestic soft lead.....	209,250	190,749	203,615
Domestic desilverized soft lead.....	74,305	61,332	63,449
Foreign desilverized lead.....	468,746	543,841	566,407
	63,916	74,481	124,086
Total refined primary lead.....	532,662	618,322	690,493
Antimonial lead.....	8,075	14,190	20,787

*Apparent Consumption of Refined Primary Lead in the United States  
(Refinery Stocks Disregarded)*

Supply:			
Stocks in bonded warehouse, January 1....	347		2,617
Imports of pigs, bars, and old metal.....	3,551	21,099	12,247
Production.....	532,662	618,322	690,493
Withdrawals:	536,560	639,421	705,357
Exports of foreign lead—			
From warehouse.....	32,355	48,736*	76,758
In manufactures, with benefit of drawback..	5,677	12,526	11,286†
Exports of domestic lead.....	5,823	1,999	5,332
Stocks in bonded warehouse, December 31..		2,617	5,045
	43,855	65,878*	98,421
Apparent consumption.....	492,705	573,543*	606,936

*Imports and Stocks in Bonded Warehouse*

Imports of lead in ore and matte.....	12,237	33,441	48,660
Imports of lead in bullion.....	62,037	80,748	77,751
Remaining in warehouse, December 31:‡			
Lead in ore and matte.....	5,235	38,016	51,737
Lead in bullion.....	3,538	40,153	47,504

*Price*

Average selling price in cents per pound.....	5.5	7.0	8.0
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\* Revised figures. † Figures for last quarter not available. ‡ Some part of this may have been smelted and refined and thus be included in the quantities given above as "foreign desilverized lead."

*Primary Lead Smelted or Refined in the United States, 1922-1924, by Sources*

Source	1922	1923	1924
Domestic ore:			
Alaska.....	324	400	582
Arizona.....	7,218	8,828	9,372
California.....	3,018	5,168	2,305
Colorado.....	11,108	23,885	25,491
Idaho.....	91,487	127,797	123,709
*Illinois.....	750	1,286	1,089
*Kansas.....	10,900	20,207	12,895
*Kentucky.....	73	66	201
*Missouri.....	202,245	169,323	191,501
Montana.....	14,551	18,345	21,226
Nevada.....	4,264	8,044	8,070
New Mexico.....	1,230	1,638	2,263
*Oklahoma.....	67,436	59,602	56,017
Oregon.....	37	47	.....
South Dakota.....	2	.....	2
*Tennessee.....	751	1,020	985
Texas.....	5	40	27
Utah.....	63,130	104,678	119,318
*Virginia.....	.....	.....	1,582
Washington.....	478	2,008	2,057
*Wisconsin.....	1,323	601	1,973
Undistributed.....	75	691	15
Zinc residues.....	1,284	362	1,320
Total.....	481,689	554,036	582,000
Foreign ore:			
Canada.....	3,604	3,632	4,633
Central America.....	14	18	30
Europe.....	519	139	328
Mexico.....	7,260	18,867	33,328
South America.....	2,458	1,461	7,663
Other foreign.....	43	171	403
Foreign base bullion (Canada and Mexico)....	50,018	50,193	77,701
Total.....	63,916	74,481	124,086
Grand total.....	545,605	628,517	706,086

\* The lead produced by these states is nonargentiferous or soft lead. About 642 tons of non-argentiferous lead was also derived from Colorado in 1924 and 179 tons from New Mexico.

## ZINC PRODUCED IN THE UNITED STATES, 1921-24

(In short tons)

	1921	1922	1923	1924
Arkansas .....	15,278	13,627	29,870	28,447
Illinois .....	48,865	76,266	93,239	93,370
Kansas .....	16,573	24,167	32,006	28,640
Oklahoma .....	41,244	74,537	119,744	118,487
Pennsylvania .....	36,378	57,319	82,003	83,016
Other states .....	30,603	52,992	82,484	87,886
Electrolytic .....	11,559	55,369	71,088	77,493
Total primary .....	200,500	354,277	510,434	517,339
From domestic ore .....	198,232	353,274	508,335	515,831
From foreign ore:				
Australia .....	133	.....	.....	.....
Canada .....	521	55	.....	1,396
Mexico .....	1,614	948	2,099	112
Total foreign .....	2,268	1,003	2,099	1,508
Total primary .....	200,500	354,277	510,434	517,339
Redistilled secondary .....	17,573	32,988	39,434	35,486
Total .....	218,073	387,265	549,868	552,825
Grade A .....	24,084	67,459	89,739	108,238
Grade B .....	4,996	36,402	58,513	48,874
Grade C .....	47,814	49,980	90,459	100,290
Grade D .....	141,179	233,424	311,157	295,423
Total .....	218,073	387,265	549,868	552,825
Average selling price per pound:	Cents	Cents	Cents	Cents
Grade A .....	5.6	6.0	7.1	6.8
Grade B .....	5.5	6.0	7.1	6.8
Grade C .....	4.9	5.6	6.7	6.4
Grade D .....	4.9	5.6	6.7	6.4
All grades .....	5.0	5.7	6.8	6.5
Total value of output .....	\$21,807,000	\$44,148,000	\$74,782,000	\$71,867,000
Zinc dust:				
"Atomized" .....	999	3,859	4,376	4,063
"Blue powder" .....	2,006	3,394	3,676	3,894

## CONSUMPTION OF PRIMARY ZINC IN THE UNITED STATES, 1921-1924

(In short tons)

	1921	1922	1923	1924
Supply:				
Stock January 1—				
In bonded warehouse .....	.....	131	80	80
At smelters .....	71,037	70,321	16,810	27,803
Production—				
Domestic slabs .....	167,832	299,765	452,502	454,799
Domestic rolled zinc .....	30,400	53,509	55,833	61,032
Foreign slabs .....	2,268	1,003	2,099	1,508
Imports—				
Foreign .....	6,739	52	21	25
Domestic returned .....	731	.....	.....	.....
Total available .....	279,007	424,781	527,345	545,252
Withdrawn:				
Exports—				
Foreign, from warehouse .....	1,256	3,471	7,080	*
Foreign, under drawback .....	130	1,298	.....	†
Domestic slabs .....	1,753	26,815	42,131	72,583
Domestic sheets .....	1,816	3,217	3,732	3,658
Stock December 31—				
In bonded warehouse .....	131	80	80	†
At smelters .....	70,321	16,810	27,808	20,754
Total withdrawn .....	75,407	51,691	80,831	96,995
Apparent consumption .....	203,600	373,090	446,514	448,257

Retort Capacity

Total retorts at active plants .....	127,048	137,540	140,352	134,160
Retorts in operation at end of year .....	42,400	81,000	86,700	81,400

\* Included with domestic. † No exports, January-September, inclusive. Figures for last quarter not available. ‡ Less than one-half ton.

## MAGNESITE IN 1924

The Geological Survey announces that the magnesite material marketed in the United States in 1924 from domestic mines was equivalent to 100,413 short tons of crude magnesite, valued at \$789,728, a decrease of 32 percent in quantity and 28 percent in value as compared with the quantity marketed in 1923. The State of Washington produced in 1924, 52,876 tons, which was more than half the total output for the year. A low value on the crude uncalcined rock is reported by Washington operators. The value of California crude magnesite produced in 1924, which amounted to 47,537 tons, is estimated at \$13.67 a ton, but as all the product is sold calcined or dead burned, the value thus fixed is entirely arbitrary.

There were fewer producers of magnesite in California in 1924 than in 1923, and the industry throughout the state was rather dormant during the summer but revived toward the end of the year. The industry in Washington was also working on a smaller scale because of the imports of magnesite. Until freight rates or import tariffs, or both, are further adjusted, domestic producers will probably not be warranted in greatly increasing their output. Statistics were compiled by J. M. Hill, of the Survey.

## PHOSPHATE ON PUBLIC LANDS

TRACTS of public land approximating 4,000 acres in the States of Montana and Utah were classified as valuable for phosphate during the past month, according to the Interior Department.

In the States of Montana, Utah and Wyoming nearly 5,000 acres of public land were classified as non-phosphate lands after an examination by geologists of the Geological Survey. These areas had been temporarily designated as containing phosphate.

During the month nearly 100,000 acres of land in Montana and Utah as a result of classification by the Geological Survey were included in formal orders designating the land as nonirrigable under the enlarged homestead acts and to that extent subject to entry as homesteads of 320 acres or less. More than 150,000 acres in Colorado, Florida and Montana were classified under the stock-raising homestead law and designated for entry in tracts of 640 acres or less. Much of the acreage involved in these designations is included in original entries or in applications under the enlarged and stock-raising homestead acts which confer a preference right.

During the month about 10,000 acres in Utah were classified as power-site lands.



### FLUORSPAR IN 1924

The shipments of fluorspar in 1924, as shown by a statement given out by the Department of the Interior compiled by Hubert W. Davis, of the Geological Survey, amounted to about 124,914 short tons, valued at \$2,453,950, an increase of about 3 percent in quantity but a decrease of about 2 percent in total value as compared with 1923. The reported average selling price f. o. b. mine shipping point decreased from \$20.68 in 1923 to \$19.65 in 1924. Colorado and Kentucky were the only states that recorded an increase in 1924. The shipments of fluxing grade fluorspar to steel plants and foundries showed an increase of about 11 percent in 1924, but the shipments of the higher grades of fluorspar recorded a decrease of about 28 percent. The stocks of fluorspar at mines or at shipping points at the end of 1924 amounted to about 69,000 short tons. These stocks consisted of about 28,900 tons of crude fluorspar (which must be milled before it can be marketed), 32,400 tons of gravel fluorspar, 6,600 tons of lump fluorspar, and 1,100 tons of ground fluorspar.

The imports of fluorspar into the United States in 1924—51,043 short tons, the largest quantity ever imported—were equivalent to about 41 percent of the domestic shipments of fluorspar, as compared with 35 percent in 1923. England, the principal source of the imports, supplied about 49 percent of the total. The value of the foreign fluorspar averaged \$10.89 a ton in 1924. The cost to the consumers in the United States includes in addition to the duty of \$5 a ton, the ocean freight charges, the cost of transporting the fluorspar from the mines to the docks, loading charges at the docks, and other small charges.

The producers of about 94 percent of the basic open-hearth steel that was made reported that they consumed 111,419 short tons of fluorspar in 1924 and had stocks on hand amounting to 60,207 short tons on January 1, 1925. If the steel companies that did not report consumed like proportion of fluorspar, the figures given indicate a total consumption in all steel plants of about 118,500 tons in 1924 and total stocks of about 64,000 tons on hand January 1, 1925. The total consumption of fluorspar by steel plants in 1923 was about 138,000 tons, and the total stocks on January 1, 1924, were about 49,900 tons. The consumption of fluorspar per ton of steel produced in 1924 averaged 7.8 pounds, as compared with 8.1 pounds in 1923.

### GRAPHITE IN 1924

The graphite industry in the United States suffered a considerable setback in 1924, as shown by figures compiled by

the Geological Survey in cooperation with the State geological surveys of Alabama and Michigan. The output in 1924 was 4,971 short tons, valued at \$87,510, as compared with 6,038 tons, valued at \$190,944 in 1923. Of this output amorphous graphite amounted to 4,071 tons, a very slight increase as compared with 1923, and crystalline graphite amounted to 900 tons (1,800,000 pounds), as compared with 1,982 tons (3,964,000 pounds) in 1923, a decrease of 55 percent. During the World War—both before and during our participation in it—the graphite industry in the United States flourished and reached its highest output and value. With the cessation of hostilities the demand fell off, and the sales decreased markedly in 1919. In 1920, in line with the general prosperity, the output increased, but it fell off again and reached its lowest output and value in many years in 1921. In 1922 and 1923 the trend was upward and increases were made. The manufacture of artificial graphite at Niagara Falls, N. Y., also decreased markedly in 1924, 10,986,192 pounds being manufactured, as compared with 1923, when the output was 26,761,015 pounds.

### FULLER'S EARTH IN 1924

THE largest output of fuller's earth on record is that for 1924, as reported by the Department of the Interior through the Federal Geological Survey working in cooperation with the State Geological Surveys in Alabama, Florida, Georgia, and Illinois. Thirteen operators in six States reported that 177,994 short tons of fuller's earth were sold in 1924, valued at \$2,632,342, or \$14.79 a ton. This output is 19 percent greater than that of 1923, but it is more than four times that of 1914. The value of the output for 1924 was also the largest ever recorded. It was 17 percent greater than that of 1923 and 5 percent greater than that of 1920, the previous year having the record of greatest value. It was more than six times as large as that of 1914. Since 1920 there has been a steady decline in the average price per ton, the price in 1924 being nearly \$5 lower than that in 1920, the year of highest average.

The South continues to produce the larger part of the output. Georgia was the leading State in output and value, displacing Florida, which has occupied that position since the beginning of the industry. Florida was second and Texas was third in output and value. These three States reported 93 percent of the output and value in 1924. The producing States, named in the order of their output, were Georgia, Florida, Texas, Illinois, Massachusetts and Alabama.

### POTASH IN 1924

THE Department of the Interior announces that returns received by the Geological Survey from the producers of potash in the United States indicate that the output in 1924 amounted to 43,719 short tons of crude potash salts containing 22,896 short tons of potash (K<sub>2</sub>O). The sales amounted to 37,492 short tons of crude potash containing 21,880 short tons of K<sub>2</sub>O, valued at \$842,618. Over 30,000 short tons of crude potash were held by the producers December 31, 1924.

### ZINC RETORT RESIDUES

A discussion of the metallurgical treatment of zinc-retort residues is contained in Technical Paper 341, just issued by the Bureau of Mines. The paper contains the results of experimental work performed by B. M. O'Harra, associate metallurgist, Bureau of Mines, cooperating with the Missouri School of Mines and Metallurgy.

The residues resulting from the retort distillation of zinc ores have 25 to 75 per cent of the weight of the original ore and contain 5 to 15 per cent of zinc, states the author. They consist of unconsumed coal or coke and the constituents of the ore that are not volatilized during the distillation of the zinc.

Retort smelters in the United States produce normally an annual average of 45,000 tons of distilled primary zinc, as distinguished from electrolytic and redistilled secondary zinc. On the assumption that about 1 ton of zinc is produced from two tons of concentrate, there must be normally about 900,000 tons of concentrate treated annually in retort smelting plants. If the weight of retort residues is estimated to be 40 per cent of the weight of the concentrates smelted and is assumed to have an average zinc content of 8 per cent, it is roughly calculated that approximately 360,000 tons of residues, containing about 28,800 tons of zinc, are produced annually in the United States. Besides the current production of residues there are at many smelter sites large accumulations from past operations available for treatment.

In addition to zinc, the residues contain much unburned coal, carbonized or converted to coke during the distillation process. Residues from most western zinc ores also contain lead and silver.

The treatment of these residues for the recovery of the contained coke and metal values presents a fertile field for investigation and has received the attention of many metallurgists, as is manifest from the number of methods tried and processes patented. This paper may be obtained from the Superintendent of Documents, Washington, D. C., at a price of 5 cents.

## INDUSTRY BACKS STANDARDIZATION MOVEMENT

*National Advisory Committee Formed To Cooperate With Leaders In This Work For The Elimination Of Waste*

THAT American business, big and little, is organizing to put all its power and prestige back of the standardization movement, and to facilitate and expedite the extensive, nationwide work is announced by the American Engineering Standards Committee.

The first step in this campaign to give impetus to the united industrial effort against waste and for the quickening of trade is the formation of a committee of five first-line executives, to act as an advisory body to the American Engineering Standards Committee. This advisory committee will consist of the following:

J. A. Farrell, president of the U. S. Steel Corporation; G. B. Cortelyou, president of the Consolidated Gas Company, New York; J. W. Lieb, vice-president of the New York Edison Company; L. F. Loree, president of the Delaware & Hudson Co., and Gerard Swope, president of the General Electric Company.

### SCOPE OF COMMITTEE

In focusing the united influence of big industries of national and international ramifications on the American Engineering Standards Committee program, the committee of five just formed will emphasize what is regarded as the fundamental principle of standardization: That standardizing must facilitate and stimulate, and not hinder industry.

The committee will assist in keeping executives in touch with the national movement in its development, in extending its influence and support both intensively and extensively among industrial groups, and in bringing about the fullest cooperation along right lines between industry and Government in standardization work, and particularly in the solution of the problem of industrial waste, into which Secretary Hoover has thrown the resources of the Department of Commerce.

Hitherto the movement has been largely centered in and carried on by the technical man. The appointment of the committee marks definite recognition of the fact that standardization has now become a managerial problem of the first rank in industrial production, distribution and utilization, and as such deserves the fullest industrial support.

The American Engineering Standards Committee, organized in 1918, has been engaged in standardizing work on a national basis since that time, representing a membership of 34 national organizations, including nine engineering societies, 18 industrial associations, and seven departments of the Federal Gov-

ernment. It serves primarily as a national clearing house for engineering and industrial standardization, with the purpose of coordinating standardization work in the individual industries, effected by associations, societies and governmental agencies, into a unified system of national standardization.

### REPRESENTATIVE BODY

Significant is the fact that about 250 organized trade, technical, industrial and governmental bodies are cooperating with the American Engineering Standards Committee, and have about 1,200 accredited representatives on its various working sub-committees. This extensive participation in the committee's work, it is pointed out, assures the acceptance and actual adoption of the national standards thus worked out and approved. To date, some 170 standardization projects are actively under development or have reached the stage of approved standards.

This new plan to intensify the national standardization movement by lending the American Engineering Standards Committee the support of the advisory committee consisting of five first-line executives representing as many of the largest industrial interests in the country, had its inception at a dinner attended by 30 industrial leaders, given by J. A. Farrell, president of the United States Steel Corporation; John A. Freeman, vice-president, Manufacturers' Mutual Fire Insurance Company; Guy E. Tripp, chairman, and E. M. Herr, president of the Westinghouse Electric & Manufacturing Co. In addition to these there were present at the dinner: Walter R. Addicks, vice-president, Consolidated Gas Company; M. W. Alexander, managing director, National Industrial Conference Board; W. W. Atterbury, vice-president, Pennsylvania Railroad; Willis Booth, president, International Chamber of Commerce; John A. Coe, president, American Brass Co.; C. P. Coleman, president, Worthington Pump & Machinery Co.; Edward J. Cornish, president, National Lead Company; Geo. B. Cortelyou, president, Consolidated Gas Company; J. M. Davis, president, Manning, Maxwell & Moore; Henry L. Doherty, president, Henry L. Doherty & Co.; Col. John H. Finney, manager, Washington office, Aluminum Company of America; Norman J. Gould, president, The Goulds Manufacturing Company; Bancroft Gherardi, vice-president, American Telephone & Telegraph Co.; Dr. Frank B. Jewett, vice-president, American Telephone & Telegraph Co.; Robert Lamont, president, Steel Foundries Cor-

poration; J. W. Lieb, vice-president, New York Edison Company; L. F. Loree, president, Delaware & Hudson Co.; James H. McGraw, president, McGraw-Hill Company; E. J. Mehren, vice-president, McGraw-Hill Company; Frank W. Smith, vice-president, United Electric Light & Power Co.; L. S. Storrs, president, The Connecticut Company; Charles B. Seger, president, United States Rubber Company; A. A. Stevenson, vice-president, Standard Steel Works Company; Gerard Swope, president, General Electric Company; A. W. Whitney, associate general manager, National Bureau of Casualty & Surety Underwriters; C. E. Skinner, chairman, American Engineering Standards Committee; P. G. Agnew, secretary, American Engineering Standards Committee.

### COAL ON PUBLIC LANDS

Production of coal from the public lands of the United States, the richest owner of coal property in the world, was 1,495,026 tons during the year 1924, it was announced by the Interior Department.

The largest production was from public lands in Wyoming, the amount being 791,911 tons, or more than 11 percent of all the coal produced in the state. Public lands in Colorado produced the second largest tonnage. A total of 275,040 tons were produced, representing over 2 percent of all coal produced in the state.

Utah was third on the list, the amount of coal produced from the public domain in that state being 181,015 tons, while North Dakota records show a production of 152,650 tons of coal from public lands located within its border. This production was 14 percent of all coal produced in the state.

A list of the states with the amount of coal produced in 1924 from public lands follows: Colorado, 275,040 tons; Montana, 36,847 tons; New Mexico, 21,013 tons; North Dakota, 152,650 tons; Oregon, 270 tons; South Dakota, 554 tons; Utah, 181,015 tons; Washington, 35,722 tons; Wyoming, 791,911 tons.

Records of the Interior Department also show that 1,100,000 tons from restricted and segregated Indian lands were produced in the State of Oklahoma, which was more than 39 percent of all coal produced in that state.

A new process for the treatment of Norwegian pyrite is expected to facilitate competition with Spanish pyrites and sulphur from the U. S. This process permits the extraction of iron and copper from pyrite; sulphur is then a by-product. From 1,000,000 tons of pyrite, it is reported 300,000 tons of iron and 400,000 tons of sulphur can be extracted.



### Lewis Again Rejects Wage Revision Conference

Attempts of coal operators to arrange a conference with the United Mine Workers to modify the Jacksonville wage agreement are still being made. Operators of Ohio and western Pennsylvania put the matter up to John L. Lewis on March 27, when a letter, signed by the president of the Pittsburgh Vein Operators' Association of Ohio and other prominent operators of Ohio and Pennsylvania, was sent to him requesting that representatives of the mine workers meet with operators to consider a wage revision.

In the operators' letter it was pointed out that "twice in 1917 the United Mine Workers asked the operators to raise wages before the end of the contract and each time the operators met the miners and recognized the situation as to increased cost of living for the men and agreed to revise the wage contract upwards."

On April 6 Mr. Lewis replied, declining the invitation. "The United Mine Workers of America," said Mr. Lewis, "will be glad to give the most profound consideration and helpful cooperation to any practical plan of improvement suggested by the operators, parties to the agreement, which does not contemplate a modification of existing wage contracts or a reduction in the earnings of our people."

### Union Cannot Set Miners' Coal Loadings, Says Conciliation Board

In a case brought up by the Lehigh and Wilkes-Barre Coal Company, the Anthracite Board of Conciliation ruled that a local union has no right to set the maximum number of cars a miner is allowed to load in a day. The question was brought up following a ruling of the local union that no miner at the Wanamie mine, working alone, should load more than three cars daily, and no miner, working with a laborer, should load more than five cars daily.

### West Virginia Tax Bill

One of the pending proposals before the West Virginia legislature is a general tax bill in which there is a provision for a tax of 1½ per cent on mining and production of coal.

### Changes In Canadian Coal Import Duty

Certain changes in the import duty on coal are provided for in the annual budget submitted to the Canadian Parliament. Bituminous coal will be assessed a duty of 50 cents per short ton when received from those countries, including the United States, whose imports come under the Canadian general tariff. Previously bituminous, prepared and run-off-mine, was subject to a duty of 53 cents per ton, while slack, such as will pass through a ¾-inch screen, was 14 cents per ton.

Imports of anthracite, lignite and coke remain free of duty.

There have been rumors that railroads will make a 36 cent drop in freight rates to nullify the increase on slack, which amounts to 36 cents a ton. These reports are discredited by the Trunk Line Association, the New York Central and the Pennsylvania road, the Pennsylvania holding that special action was not warranted, as this type of coal constituted only 5 percent of the total volume handled.

### Miners Request Wage Reduction

Wages in the coal mines of the Colorado Fuel and Iron Company were reduced 20 percent recently. The reduction was made following a mass meeting of miners at which a committee was appointed to request the reduction.

This is said to be the first time in any coal field of the country that a reduction in wages was made at the request of the miners. About 1,200 men were affected by the cut, which reduced wages for coal diggers from \$7.75 to \$6.25 a day.

### To Frame New Anthracite Agreement

The tri-state board of anthracite districts Nos. 1, 7 and 9 of the United Mine Workers has decided to call a convention at Scranton, Pa., during the week of June 29, in order to frame a new wage agreement to be submitted to the anthracite operators. The three district presidents were appointed to meet with President Lewis, Vice President Murray and Secretary Kennedy of the Mine Workers to complete arrangements for holding the scale convention. The present wage agreement expires August 31, and officials stated they were not in position to say whether the convention would ask for an increase.

### After Mine Safety Records

The United States Coal and Coke Company, one of the largest producers in West Virginia, and leading in that State in safety and accident prevention, recently issued a circular to employees through their general manager, Edward O'Toole, urging the production of at least 1,000,000 tons per fatality at the company's mines for the year 1925.

The No. 6 mine of this company has not had a fatal accident since February 24, 1917, during which time it has produced 4,653,907 tons. Nos. 2, 6, 8, and 9 mines of this company have produced a total of 9,356,412 tons since their last fatality.

### Union Rules Against Cooperative Coal Mining

The operation of coal mines in Indiana and Ohio on a cooperative basis has mostly ceased following action by officials of the United Mine Workers who have forbidden union miners from engaging in this practice on the ground that it is in violation of the union contract.

Tyler G. Lawson newly elected president of the Indiana district of the union, who is supposed to be friendly to the cooperative idea, reports that practically all the Indiana mines which were operating on a cooperative basis have reported the correction of their alleged violation and have offered their books for inspection.

Later reports, however, indicate that several mines will continue with this plan, conditions of employment, including wages, being in accordance with the Jacksonville agreement.

### Pittsburgh Coal Mining Institute Organized

The Pittsburgh Coal Mining Institute has adopted the following slogan in the nature of a challenge to other coal producing states. It reads as follows:

Help place Pennsylvania in the lead for safety and efficiency in the mining industry of the United States by joining the Pittsburgh Coal Mining Institute and urge others to do likewise.

### Berwind-White Reduces Wages

The Berwind-White Coal Company, with operations at Windber and Houtzdale, in the central Pennsylvania field has reduced wages of miners 20 percent.



### Battery Manufacturers Would Mine Their Own Lead

It seems to be the policy of the Ford Motor Company to go into the business themselves if the sources of some certain material are not satisfactory. With this in mind the National Association of Battery Manufacturers at a meeting in Cleveland recently discussed plans for the purchase of lead mining properties in the event the price of lead goes to a level the association considers too high. Manufacturers of storage batteries use about 20 percent of the lead consumed in the United States.

The Ford Motor Company and General Motors are pushing exploration and development work on mining properties recently purchased in Idaho. Nearly \$500,000 has been expended by General Motors in surface preparation for the development of the Livingston mine in Custer county, according to William M. Snow of Salmon City, Idaho.

The Ford Motor Company is installing a 250 horsepower Diesel engine and is figuring on much diamond drilling on the Red Bird properties, a few miles from the Livingston mine. The property carries a lead-silver replacement deposit, which will be explored.

### Belgium Firm Contracting for American Zinc

Representatives of the Vielle-Montagne Zinc Company, Belgium, one of the largest purchasers of zinc ores in the world, recently visited the Coeur d'Alene district, Idaho, to close contracts with operators for the purchase of zinc concentrates for shipment to their smelter in Belgium. This company maintains bunkers at Portland, Oreg., and has a fleet of steamers making regular trips between Antwerp and the United States.

The Belgians formerly used Australian zinc but a smelter established in Great Britain during the war is now taking the product of these mines.

### Mining By Airplane

The Independence Placer Mining Company is planning to carry supplies to its property in the Clearwater district of Idaho by airplanes. The inaccessibility of the property, located on Independence and Moose creeks, has led officers to believe that the airplane can solve their difficulties by taking all necessary supplies from Iron Mountain, Montana, in less than 40 minutes, as compared with packing them for 40 miles.

The property is located three miles below the old Moose City diggings, which are said to have yielded \$3,000,000 in the 60's.

### British Columbia Launches Campaign to Rejuvenate Mining

Business houses of Vancouver have undertaken a campaign to bring \$50,000,000 of new capital into the mining industry of British Columbia. The campaign takes the form of a drive for funds for the British Columbia Chamber of Mines, which is also, it is planned, to receive a subsidy from the Canadian government. This movement in Vancouver was followed by a similar drive in Nelson, which is the commercial center of the Kootenay's, and where an office will be opened to furnish information to inquirers about mining properties in the eastern part of the province.

In an address delivered to the Sacramento convention last year, the Honorable William Sloan, Minister of Mines of British Columbia, declared that "there is plenty of raw material waiting in the Canadian Northwest, and we extend the same cordial invitation to our neighbors to the south as we do to our fellow citizens in other parts of the British Empire to assist us in the development of the natural resources with which our country is so richly endowed."

### Expedition Into Unknown Region Of British Columbia

A second expedition headed by George Platzer, a prospector, and backed by American capital was planned for the latter part of April from Prince Rupert, B. C., into an unknown region of British Columbia, north of the Stikine river, where a tropical valley has often been rumored, according to reports from Vancouver.

The first party led by Frank Perry, a Vancouver mining engineer, is already on the outskirts of the unexplored region, it has been learned.

The expedition is backed by Charles H. Mackintosh, a former governor of the Canadian Northwest territory, his son, and Col. Phillip T. Loneragan, pioneer engineer of Seattle.

The area to be penetrated is reported to contain gold, platinum, copper, iron, lead, oil and coal.

### South African Mineral Production To Date

A report to the Department of Commerce states that the total production of all minerals in South Africa to date has amounted to £1,113,041,176. Gold production totals £790,915,388, or 71 percent and the production of diamonds has amounted to £2,280,205. Of this the Transvaal contributed £867,437,577 and Cape Province, £197,260,987.

These figures can best be appreciated when it is taken into consideration that the mining industry of South Africa is only 40 years old.

### Assessment Plan of Mining Development Urged

The North West Mining Association in a recent release to the press, urges the assessment plan of mining development, saying:

"Can the West succeed in developing its mines with assessable companies? The answer is easy. The great Coeur d'Alenes have been developed by them. Continuous development is no longer possible by nonassessable companies.

"How will assessable companies affect the prospector or small mine owner who desires to hold a block of stock as a part of the sale price of his property? That will be a matter of mere bargaining between the buyer and seller as it is today.

"The recommendations of experienced men is to interest the public in these enterprises by placing them on the second floor instead of the fifteenth floor, which nonassessable companies have been doing.

"The public must be brought closer to the promotion end and this can be done by having a small par value for the stock, and the distribution of sufficient stock at a nominal price with the understanding that monthly assessments will be levied to provide a good working fund.

"Some assessable companies are little better than nonassessable companies. A semiassessable company is one with stockholders having large blocks of stock who will only levy a 1 mill assessment once a year to do the annual assessment work. That is merely playing at mining. Such stockholders should give a large part of their stock away if they cannot sell it and make regular assessments.

"These remarks only refer to developing companies, as stockholders therein are generally alive to the requirements of their companies and are on the lookout for assessments. Self-sustaining and dividend paying mines are the only ones that allow of nonassessable stock.

### Memorial Services At Castlegate

More than a thousand miners attended memorial services held at Castlegate, Utah, on Sunday, March 8, in honor of the 173 men who lost their lives on March 8 last year in one of the Utah Fuel Company's mines.

### Keystone Purchases Central States Publishing Company

The Keystone Consolidated Publishing Company of Pittsburgh has purchased the business of the Central States Publishing Company of Columbus Ohio, including all patents and copyrights issued to the Columbus concern for the manufacture of the "Rolup" coal field maps and wall cases introduced by that company.

### Underground Movies at Spruce Mine on Mesabi Range

The Oliver Iron Mining Company has fitted up an abandoned underground pump room as a moving picture theater at its Spruce mine at Eveleth, Minn., on the Mesabi range. This has been done as part of the safety work continually carried on by the company. "Safety First" films provided by the Bureau of Mines are shown from time to time, during lunch hours and other convenient times. The theater is situated about 250 feet underground and has a seating capacity of over 200.

### Largest Concrete Smokestack To Be At Trail, B. C.

A new smokestack is being built for the zinc plant at the Trail smelter at Trail, B. C. When completed the stack will be 409 feet high and probably the highest concrete smokestack in the world.

Under a revised schedule, it is reported, zinc ore shippers to the Trail smelter will be granted a reduction in treatment charges which will amount to about \$150 per car. A reduction on lead ores is expected to be announced soon.

### California Mining Notes

In connection with the immense deeper development project of the North Star Mines Company, the annual report of the company for the year 1924 is of interest. This shows a total gold yield of \$841,472, bringing the production record since May, 1884, to \$27,406,498. The dividends paid during that period total \$5,762,040. The operating and development charges for 1924 reached \$939,841, thus making the report show a moderate deficit.

The development plan of the North Star Company is based upon the belief that new mine exists above and below a plane approximately 2,000 feet below the bottom of the present 1,600 foot vertical shaft. In this expectation, the shaft is to be sunk vertically an estimated depth of 2,000 feet and two winzes sunk on the vein incline a combined depth of 3,800 feet. Work is now under way and the estimated cost is in excess of \$700,000.

The Empire mine here continues its large operations and large production. Two drifts are being driven into the Sultana group ground, recently acquired, with good prospects of opening profitable ore bodies.

The Brunswick mine is again producing, the Mill vein having been recovered in an upraise from the 1,100 level. The showing is very good, it is authoritatively stated.

The Newtown property, one of the notable new mines of the West Grass Valley district, is under option to C. A. Stent. Exploration of the vein to an

additional depth of 150 feet before the sinking of a standard shaft is underway.

Reopening of the New England shaft at Gold Flat is progressing satisfactorily. Old stulls encountered indicate that excellent grade ore was stoped prior to the closing over 40 years ago.

At Alleghany a notable strike of high grade ore has been made in the Mugwump mine, under operation by a Honolulu syndicate.

### Metal Production In Idaho

The Coeur d'Alene district produced \$26,130,399 of the total metal production of Idaho, which amounted to \$28,337,540 in 1924, according to a report issued by Stewart Campbell, state mine inspector for Idaho.

Shoshone county (the Coeur d'Alene district) holds first place for lead, silver and zinc production, while Custer county is first in copper. Elmore county led in gold production.

### A. S. & R. Elects Directors

At the annual meeting of the American Smelting and Refining Company in the principal offices of the company, Jersey City, 24 directors were reelected, and J. Louis Van Zelm, vice-president of the Bank of New York and Trust Company, was elected to the vacancy caused by the death of Wilfred Shore. Mr. Van Zelm was suggested for the vacancy by the Nederlandsch Administratie & Trust Kantoor, of Amsterdam, which is the largest individual stockholder, of record, of the company.

### Safety Trophies Offered by Pittsburgh Coal Mining Institute

At a recent meeting of the board of managers of the Pittsburgh Coal Mining Institute, three safety trophies have been offered in contest to the employees and mining company in the Pittsburgh district having the lowest accident frequency rate for the year 1925. One trophy will be given to the employees and coal company operating in the Freeport bed, and a similar trophy to the employees and company having the best record in the Pittsburgh bed. A third trophy will be held by the winning company and their employees for a year, the name of the company inscribed thereon, and contested for annually. Much interest has been aroused in these contests.

After April 17 the offices of the American Petroleum Institute will be located in the Postum Building, 250 Park Avenue, New York, N. Y.

Louis Doremus Huntoon, consulting mining engineer, has announced the opening of an office at Kent Building, 156 Yonge St., Toronto, Canada.

### Pittsburgh Coal Co. Abandons 16 Mines

The Pittsburgh Coal Company has abandoned 16 of its 54 mines in the Pittsburgh district because of the high cost of production as compared to that of nonunion Southern coal fields. The mines affected, which have been closed since March, 1924, are now being dismantled.

### To Speak on Coal Situation

Vice President T. M. Dodson, of the Pittsburgh Coal Company, will speak on economic phases of the coal situation at the meeting of the United States Chamber of Commerce in Washington on May 20.

### Josiah Keely Heads Cabin Creek Company

The Cabin Creek Consolidated Coal Company has announced the election of Mr. Josiah Keely as president and general manager of operations, with office at Kayford, West Virginia, and Mr. C. R. Moriarty as vice president and general manager of sales, office at Cincinnati, Ohio.

### Pittsburgh Coal Company Appoints Officials

At a meeting of the Board of Directors of the Pittsburgh Coal Company, held March 25, the following officials were elected or appointed:

Executive: W. G. Warren, chairman of the board; W. K. Field, president; Aaron Westlake, secretary; H. O. Stang, Assistant secretary; Don Rose, general counsel; John B. Eichenauer, assistant general counsel; C. E. Leshner, assistant to president.

Finance: F. J. LeMoyné, vice president and treasurer; F. M. Burke, assistant treasurer; H. H. Barrett, assistant to vice president.

Accounts: J. B. L. Hornberger, vice president and comptroller; J. D. McPherson, auditor; W. L. Laramy, assistant auditor; George J. Behringer, assistant auditor; C. J. Trager, insurance manager.

Operations: T. M. Dodson, vice president; Arthur Neale, general manager of mines; H. R. Miller, chief engineer; F. E. Now, purchasing agent.

Sales: James H. Woods, vice president; W. L. Sheppard, general manager of sales.

Transportation: W. P. Buffington, traffic manager; J. W. King, Jr., assistant traffic manager.

Eli T. Conner, mining engineer, specialist in coal and coke, announces the removal of his offices from the Hudson Coal Company Building to Rooms 1202-1204 Union National Bank Building, Scranton, Pennsylvania.

## WITH THE MANUFACTURERS

### New Method of Starting Small DC Motors Eliminates Arcing

The Lehigh Valley Coal Company recently adopted a novel means of starting the small direct current motors used for driving portable mine pumps. The customary practice of throwing these motors directly on the line usually causes much spitting and arcing at the brushes.

To eliminate this, about 15 protective panels, of the General Electric CR-3171-6 type, were purchased and rewired as follows: One contactor is used to open and close the shunt field, the other to open and close the positive line to the motor. A snap switch is used to provide undervoltage release, which, when closed, completes the control circuit of the shunt field contactor. The interlock on this contactor completes the control circuit for the line contactor. The short time interval between the closing of the shunt field and the motor line by this method of wiring allows the shunt field to build up and eliminates most of the sparking when the motor is thrown on the line.

A resistor tube is connected across the contact tips of the shunt field contactor. This tube is shorted while the motor is running, but, when the motor stops, allows a small amount of current to flow through the shunt field, keeping the motor dry. The slight heating of the resistor tube prevents the accumulation of moisture inside the enclosing case when the motor is not running.

### Carels Brothers, Belgium, Obtain Working Rights from Ingersoll-Rand

A connection of much interest to the engineering world has lately been arranged between Carels Brothers of Ghent, Belgium, and the Ingersoll-Rand Company, of New York City, by which the Belgian concern will have the right to manufacture the well-known Ingersoll-Rand solid-injection type of oil engine.

Carels Brothers—organized in 1875—have long enjoyed a prominent place in the industrial life of Belgium, a country of outstanding importance among the engineering and manufacturing nations of the world. Today, after successive periods of expansion, Carels Brothers are officially known as the Societe d'Electricite et de Mecanique.

Carels Brothers were among the first of the European licensees to work under the Diesel patents; and Carels-Diesel engines have won wide recognition in many fields of service because of their excellence. Even so, Carels Brothers have sought to strengthen their enviable position in this department of engineer-

ing by means of the working rights obtained from the Ingersoll-Rand Company.

The interesting feature of this arrangement is that Europe has now come to America for the latest and the highest developments in heavy-oil engines. Thus American skill turns the tide of technical obligation by giving the fruits of its labor to Europe—the land in which the heavy-oil engine originated.

### General Electric Improves Hand Starting Compensators

The General Electric hand starting compensators bearing the type designation CR-1034 have been redesigned. These compensators are for use on alternating current circuits for starting squirrel cage induction motors.

Temperature overload relays have been incorporated in the compensator, replacing dashpot overload relays. In one of the sizes multiple rated auto-transformer coils are used instead of the single rated variety. The redesigned compensators also include an improved push-button mechanism, containing an attachment for resetting the temperature overload relay.

Closer overload protection is expected with the newer type of relay. The multiple rated auto-transformer coils, where used, permit the use of one compensator for several horsepower ratings for a given voltage. The incorporation of the relay resetting function in the push button simplifies the operation of the device, making it unnecessary to open the compensator for this purpose.

### Broderick & Bascom Rope Company's New Million Dollar Factory in St. Louis

A constantly increasing volume of business has again necessitated the expansion of the Broderick & Bascom Rope Co. They are now housed in their new \$1,000,000 fireproof plant.

The plant was designed by E. P. Frederick, general superintendent and chief engineer of the Broderick & Bascom Rope Co., who has been with the company since 1877. Mr. Frederick also supervised the erection of the building and installation of all machinery.

The biggest of all Broderick & Bascom's giant closing machines has just been moved to the new plant, having been on special duty turning out 9,200 feet of 1½-inch yellow strand rope, weighing 50,090 pounds. The reel on which it was shipped was 8½ feet high and weighed 3,180 pounds. One thousand four hundred and fifty pounds of blocking were required to hold the reel securely on the car. The cable was

made to order by the Broderick & Bascom Rope Co. for use on a precipitous mountain incline. This is the longest and heaviest cable ever made for incline purposes. This machine is capable of laying up wire rope 4 inches in diameter, weighing 70 tons, or 140,000 pounds.

The Broderick & Bascom Rope Co. was established by John J. Broderick and Joseph D. Bascom in St. Louis in 1875 and was incorporated in 1882. In their earlier days wire rope was made by hand on a "rope walk" a mile long, then the generally accepted method of making long cables in one continuous length. This company introduced into St. Louis the first wire-rope-making machinery west of the Alleghenies, enabling them to make ropes of any length in a comparatively small building. The growth of the Broderick & Bascom Rope Co. has been simultaneous with the growth of the use of wire rope for industrial purposes.

Broderick & Bascom ropes are shipped to oil districts, mining districts, and logging countries all over the world.

Joseph D. Bascom, one of the two founders, is chairman of the board; John K. Broderick is president; Chas. E. Bascom, secretary and treasurer. John J. Broderick died in 1919.

### New Industrial Crawling Tractor Crane

Industrial Works, Bay City, Mich., has just announced a new and greatly improved 10-ton crawling tractor crane. This crawler crane, known as their type DC, is very similar in outward appearance to the former types of tractor cranes built by that company, but its design embodies a host of new engineering features such as split gears for propelling, increased speeds, double clutch mechanism, unusually long tractor belts, independent functions, etc., which, it is claimed, make that machine the fastest, simplest, sturdiest and most rugged type yet produced, and the most economical to operate.

The most important of all the new features is the system of split gears by which each tractor belt is separately controlled. Two concentric vertical propelling shafts at the axis of revolution lead two independent but concentric trains of spur and bevel gears, each operating one tractor belt. Each belt is directly controlled by two powerful friction clutches and brakes in the revolving upper works, which gives absolutely independent, definite and easy control over each belt while propelling. This is an all-gear drive from engine to sprockets with no chains in the mechanism at all. The Industrial Type DC is said to be the only crawler crane which steers and



propels by friction clutches. It is also said to be the only crane which has a friction clutch and band brake for each tractor belt. These features make maneuvering in close quarters comparatively simple.

This crane can be equipped to operate with a steam engine, electric motor, gasoline motor or fuel oil engine of the Diesel type to suit any operating conditions known today. It is extremely versatile, operating with clamshell or dragline bucket, electro-magnet, hook and block or grapple. It is readily convertible into a shovel or a pile driver. Any equipment that operates on a boom can be applied.

#### The Lemley Model "F" Friction Clutch

The Lemley Model "F" has been developed to meet the demand for a medium and light duty clutch which can be conveniently applied to practically any machine or countershaft which requires a friction clutch.

It has few parts, all of which are in plain view and readily accessible. No special tools are required to adjust or disassemble completely. The principle of operation is simple and is clearly evident after only a few minutes inspection.

Uniform pressure on the friction surfaces is assured at all times. The two toggles are adjusted at the same time by means of one split ring nut.

Free floating friction rings of fibre or asbestos brake-lining material is used. Model "F" is furnished as sleeve clutches, cut-off couplings, or bolted to the arms of pulleys, sprockets, gears, sheaves, etc. Descriptive bulletin gladly sent to interested parties.

Other types of "Lemley" clutches are built for various classes of work and for heavy or light duty. W. A. Jones Foundry & Machine Co., main office and works, 4401 West Roosevelt Road, Chicago, Ill., are the exclusive manufacturers and distributors.

#### Price Reductions

A price reduction on the Type "C" Portable Bucket Loader and the "Cub" Portable Belt Conveyor is announced by the Link Belt Co.

These machines, complete with two or three phase, 60 cycle alternating current motor, are now reduced in price to \$475 f. o. b. Chicago or Philadelphia.

The Link-Belt Company states that due to the quantity production of these two types of portable loaders, considerable saving has been effected in manufacturing cost, which they are passing along to the user.

The General Electric Company has announced an average reduction of 10 percent on standard types of polyphase in-

duction motors in sizes from 1 to 15 horsepower inclusive, and an average of 4 percent in sizes from 15 to 100 horsepower inclusive, both effective April 6.

In making the announcement, J. G. Barry, vice-president, said: "These motors are used to the extent of millions of dollars per year in factories and workshops. Improvements in design, in standardization and in processes of manufacture have produced lower costs, making this reduction in price possible."

The Austin Company, engineers and builders, have been awarded the contract for the construction of a new building for the Frederick Post Company, Chicago, manufacturers of blueprint paper and drawing-room supplies. The structure is to be two stories, 50 by 125 feet.

The Chicago office of the builder will handle construction and all material supplies.

Lyle Marshall, former manager of the Service Department of the Industrial Works, Bay City, Mich., and later connected with the Chicago office of that company, has recently been appointed district sales manager with new offices at 619 Dixie Terminal Building, Cincinnati, Ohio.

#### NEW EQUIPMENT CATALOGS

##### New Link-Belt Book of Rivetless Chain

An interesting book describing Link-Belt Rivetless Chain replete with illustrations has just been published by the Link-Belt Company.

The book portrays the assembly and disassembly of this simple chain, which has only three parts. The text matter is supported by tables of weights and strengths, and describes many of the uses to which this chain can be put.

This chain may be used to advantage on all types of conveyors and elevators; its light weight and great ultimate strength make it ideal for extremely long conveyors, where the load is heavy and the weight of the chain an important consideration. The anthracite coal industry has used this chain for many years, and its success in this industry has served to bring the attention of other industries to these salient features.

Copies will be mailed free on request, to the Link-Belt Company, Chicago, Philadelphia or Indianapolis.

The Hardinge Company has issued a Bulletin No. 21 on their Rock Dusting Equipment for coal mines. The Bulletin is well printed, illustrated and gives interesting information in condensed form upon the Hardinge Stationery Pulverizing Plant, and the Hardinge Portable Pulverizer and Duster. It also in-

cludes comments upon preparation of rock dust.

Poole Engineering & Machine Co. has just issued a pamphlet on how Poole gears are made.

This bulletin describes and illustrates the Poole method of making machine moulded gears and describes in detail how the high degree of accuracy for which Poole gears are noted is obtained. Copy will be mailed free on request to Poole Engineering & Machine Co., Baltimore, Md.

An interesting catalog recently has been published by the Raymond Bros. Impact Pulverizer Company of Chicago, which covers their regular line of roller mills and pulverizers equipped with air separation, and also a special bulletin covering a new line of IMP mills.

Practically all of these machines can be used for making rock dusting materials for coal mines. The capacities of the mills, sizes necessary and the best type are determined by the material to be ground and the fineness required.

Even though the material to be handled is an ordinary lime or shale, this will vary with the mine from which it is obtained, and capacity on a given machine may vary as much as 1,000 to 2,000 pounds.

These bulletins go into the subject of different grades of fineness of materials for rock dusting and the ability of their equipment to meet every requirement. Copies may be obtained upon request to their home office, 1315 North Branch St., Chicago.

The Hill Clutch Machine & Foundry Co. has just issued a bulletin, T-221, describing their "industrial type" speed transformer.

In announcing this bulletin they assert that "the application of speed transformers is becoming more popular every day. It is the 'short cut' from motor to machine or from shaft to shaft where speeds are widely different. The application of our 'industrial type' speed transformer eliminates cumbersome speed changing devices, saves power losses and, being a closely coupled unit, requires very little space on shaft."

Copies may be obtained upon request to their home office, Breakwater Avenue and West Sixty-fifth Street, Cleveland, Ohio.

The American Manganese Steel Company has just issued a circular which contains a list of practically all of the applications of manganese steel as so far developed, and also a tabloid exposition of the character and peculiarities of manganese steel.



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**ROBERT J. MONTGOMERY,**  
Vice-President and General Coal Agent

**General Offices:**  
Reading Terminal, Philadelphia, Pa.



# BUYER'S DIRECTORY

## ACETYLENE, Dissolved (Or in Cylinders)

Prest-O-Lite Co., Inc.,  
30 E. 42nd St., N. Y. C.

## ACETYLENE GAS

Prest-O-Lite Co., 30 East 42nd St.,  
New York City.

## ACETYLENE GENERATING APPARATUS

Oxweld Acetylene Co., 30 E. 42nd St.,  
New York City.

## ACID, SULPHURIC

Irrington Smelting & Refining Works, Irvington, N. J.

## AERIAL TRAMWAYS

American Steel & Wire Co., Chicago and New York.

## AIR COMPRESSORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Ingersoll-Rand Co., 11 Broadway,  
New York City.

## AMALGAMATING BARRELS

Traylor Engineering & Mfg. Co.,  
Allentown, Pa.

## APPLIANCES, ENGINEERING

The Lunkenheimer Co., Cincinnati, Ohio.

## AUTOMATIC CAR CAGES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

## AUTOMATIC FEEDERS, GRAVITY

G. M. Johnson Mfg. Co., Jeannette, Pa.

## AUTOMATIC (Mine Doors, Truck and Electric Switches)

American Mine Door Co., Canton, Ohio.

## AUTOMATIC SWITCH THROWERS

G. M. Johnson Mfg. Co., Jeannette, Pa.

## AUTOMATIC WEIGHING MACHINES

Streeter-Amet Weighing & Recording Co., Chicago, Ill.

## BATTERIES (Storage, Gas Welding, Cutting, Dissolved Acetylene)

Prest-O-Lite Co., 30 East 42nd St.,  
New York City.

## BATTERY SCREENS

Ludlow-Saylor Wire Co., 608 S. Newstead Ave., St. Louis, Mo.

## BEARINGS (Roller)

Hyatt Roller Bearing Co., Harrison, N. J.

## BELTING (Conveyor, Elevator, Transmission)

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## BELTING, SILENT CHAIN

Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Morse Chain Co., Ithaca, N. Y.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## BINS (Coke and Coal)

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## BIT SHARPENERS

Ingersoll-Rand Co., 11 Broadway,  
New York City.

## BLACK DIAMONDS

R. S. Patrick, Sellwood Building,  
Duluth, Minn.

## BLASTING POWDER

Hercules Powder Co., 934 King St.,  
Wilmington, Del.

## BLASTING SUPPLIES

du Pont Powder Co., The E. L.,  
Wilmington, Del.  
Hercules Powder Co., 934 King St.,  
Wilmington, Del.

## BLOWERS' CENTRIFUGAL

Ingersoll-Rand Co., 11 Broadway,  
New York City.

## BLOWPIPES, Brazing, Carbon Burning, Cutting, Lead Burning, Welding, Welding and Cutting

Oxweld Acetylene Co., 30 E. 42nd St.,  
New York City.

## BOILER MOUNTINGS

The Lunkenheimer Co., Cincinnati, Ohio.

## BREAKERS (Construction and Machinery)

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Wilmoit Engineering Co., Hazleton, Pa.

## BUCKETS (Elevator)

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## CABLES

American Steel & Wire Co., Chicago and New York.

## CABLES (Connectors and Guides)

American Mine Door Co., Canton, Ohio.

## CABLEWAYS

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Lidgerwood Mfg. Co., 96 Liberty St.,  
New York City.

## CAGE (Safety Appliances)

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

## CAGERS, AUTOMATIC

G. M. Johnson Mfg. Co., Jeannette, Pa.

## CAGES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
G. M. Johnson Mfg. Co., Jeannette, Pa.  
Lidgerwood Mfg. Co., 96 Liberty St.,  
New York City.  
Traylor Engineering & Mfg. Co.,  
Allentown, Pa.

## CARBON AND BORTZ

R. S. Patrick, Sellwood Building,  
Duluth, Minn.

## CARBON BURNING APPARATUS

Oxweld Acetylene Co., 30 E. 42nd St.,  
New York City.

## CARBON RODS AND PASTE FOR WELDING

Oxweld Acetylene Co., 30 E. 42nd St.,  
New York City.

## CAR HAULS

Jeffrey Mfg. Co., 958 N. 4th St.,  
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Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## CAR WHEEL BEARINGS

Hyatt Roller Bearing Co., Harrison, N. J.

## CASTINGS

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.

## CHAIN RAIL CAR HAULS

G. M. Johnson Mfg. Co., Jeannette, Pa.

## CHAINS

Jeffrey Mfg. Co., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Morse Chain Co., Ithaca, N. Y.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## CHAINS, AUTOMOBILE ENGINE

Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Morse Chain Co., Ithaca, N. Y.

## CHAINS, COAL CUTTING

Goodman Mfg. Co., Halsted St. and 48th Pl.,  
Chicago, Ill.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.

## CHAINS, DRIVE

Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Morse Chain Co., Ithaca, N. Y.

## CHAINS, FRONT END

Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
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Morse Chain Co., Ithaca, N. Y.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## CHAINS, SILENT (Rocker-Joint)

Morse Chain Co., Ithaca, N. Y.

## CHAINS, SLING

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Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
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## CHEMICALS

Roesler & Haaslach Chemical Co., 709-717 Sixth Avenue,  
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## CHEMISTS

Hunt, Robt., Company, Insurance Exchange,  
Chicago, Ill.

## CHILI MILL SCREENS

Ludlow-Saylor Wire Co., 608 S. Newstead Ave.,  
St. Louis, Mo.

## CLAMPS (Trolley)

Ohio Brass Co., Mansfield, Ohio.

## CLUTCHES

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## COAL COMPANIES

General Coal Company, Land Title Bldg.,  
Philadelphia, Pa.  
Lehigh Coal & Navigation Co., Philadelphia, Pa.  
Thorne, Neale & Co., Philadelphia, Pa.  
Bertha-Consumers Company, Chamber of Commerce Bldg.,  
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## COAL CRUSHERS

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## COAL CUTTERS

Goodman Mfg. Co., Halsted St. and 48th Pl.,  
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Ingersoll-Rand Co., 11 Broadway,  
New York City.  
Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## COAL HANDLING MACHINERY

Jeffrey Mfg. Co., 958 N. Fourth St.,  
Columbus, Ohio.  
Lidgerwood Mfg. Co., 96 Liberty St.,  
New York City.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## COAL LOADERS

Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.

## COAL MINING MACHINERY

Goodman Mfg. Co., Halsted St. and 48th Pl.,  
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Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave.,  
Chicago, Ill.

## COAL MINING PLANTS

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## COKE SCREENS

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St. Louis, Mo.

## COMPRESSORS, AIR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Ingersoll-Rand Co., 11 Broadway,  
New York City.

## COMPRESSORS, MINE CAR

Ingersoll-Rand Co., 11 Broadway,  
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**CONCRETE REINFORCEMENT**  
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**CONDENSERS**  
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Ingersoll-Rand Co., 11 Broadway, New York City.

**CONTROLLERS**  
Goodman Mfg. Co., Halsted St. and 48th Place, Chicago, Ill.

**CONVERTORS, COPPER**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Traylor Engineering & Mfg. Co., Allentown, Pa.

**CONVEYOR BEARINGS**  
Hyatt Roller Bearing Co., Harrison, N. J.

**CONVEYORS**  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

**CONVEYORS, BELT**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

**CONVEYORS, CHAIN FLIGHT**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.  
Wilmot Engineering Co., Hasleton, Pa.

**CONVEYORS, COAL**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Lidgerwood Mfg. Co., 96 Liberty St., New York City.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

**CONVEYORS AND ELEVATORS**  
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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

**CONVEYORS, PAN OR APRON**  
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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

**CONVEYORS, SCREW**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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H. R. Ameling Prospecting Co., Rolla, Mo.  
Hoffman Bros., Punxsutawney, Pa.  
**COUPLINGS, FLEXIBLE**  
Fawcus Machine Co., Pittsburgh, Pa.

**CROSSINGS AND CROSSEOVERS**  
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**CRUSHER SCREENS**  
Ludlow-Saylor Wire Co., 608 S. Newstead Ave., St. Louis, Mo.

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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Traylor Engineering & Mfg. Co., Allentown, Pa.

**CRUSHERS (Gyratory)**  
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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

**CUTTING APPARATUS, Oxy-Acetylene, Oxy-Hydrogen**  
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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

**CYANIDE**  
American Cyanamid Co., New York, N. Y.  
Roessler and Hasselbacher Chemical Company, 709 Sixth Avenue, New York City.

**CYANIDE PLANTS**  
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**DECARBONIZING APPARATUS**  
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Ingersoll-Rand Co., 11 Broadway, New York City.  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

**DRYERS**  
Traylor Engineering & Mfg. Co., Allentown, Pa.

**DUMP CARS**  
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

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**DYNAMOS**  
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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

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**FLIES**  
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Ohio Brass Co., Mansfield, Ohio.

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American Steel & Wire Co., Chicago and New York.

**ELECTRICAL SUPPLIES**  
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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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**ELEVATOR MACHINERY**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

**ELEVATOR MACHINERY**  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

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**ENGINE TRIMMINGS**  
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**ENGINES, STEAM**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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"ALL SALESMEN bother us more or less," said an Indiana engineer, "but some concerns do not perpetrate salesmen of the *boresome* sort. They are often helpful in making clear some obscure matter. Their companies would probably sell exactly as much goods if they did not help us, but the goods would not give as much satisfaction, for the simple consideration that we should not be able to make the best use of what we do use."

Oxweld Salesmen are neither order takers nor peddlers. Nor are they of the boresome sort. They are technical advisers and helpers, and their chief mission is to see that you get the greatest possible use out of your Oxweld apparatus.

Every Oxweld representative will tell you honestly whether you can use Oxweld apparatus profitably or not. Every one can help you extend the usefulness of our apparatus after you purchase it. Half of these field representatives have been with Oxweld for five years or more and can bring valuable experience to you.

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**GAS (Nitrogen, Oxygen)**  
Linde Air Products Co., 30 E. 42nd St., New York City.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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**GEARS, HERRINGBONE**  
Fawcett Machine Co., Pittsburgh, Pa.

**GEARS, SILENT CHAIN**  
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Morse Chain Co., Ithaca, N. Y.

**GEARS, SPUR**  
Fawcett Machine Co., Pittsburgh, Pa.

**GEARS, WORM**  
Fawcett Machine Co., Pittsburgh, Pa.

**GEARS, WORM WHEELS**  
Fawcett Machine Co., Pittsburgh, Pa.

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Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.

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**GLOVES, ASBESTOS**  
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

**GOGGLES, WELDING**  
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Ohio Brass Co., Mansfield, Ohio.

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Fawcett Machine Co., Pittsburgh, Pa.

**HOIST DRIVES**  
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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

**HOISTS, PORTABLE**  
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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

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Lidgerwood Mfg. Co., 96 Liberty St., New York City.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, O.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.  
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, O.  
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.  
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Jeffrey Mfg. Co., 958 N. 4th St., Columbus, O.  
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Hoffman Bros., Punxsutawney, Pa.  
Ingersoll-Rand Co., 11 Broadway, New York City.

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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

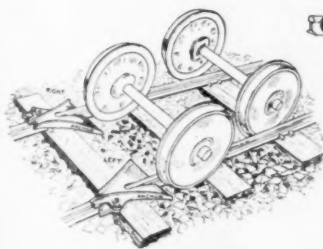
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The "Anchor" Rerailers lock firmly to the track by an eccentric cam that binds them more firmly to the rail with every car that strikes them. They require no spikes or blocks—a good safety feature—and they are easily released by a kick in the opposite direction.

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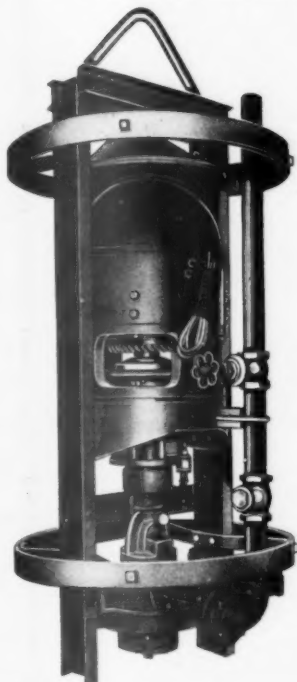
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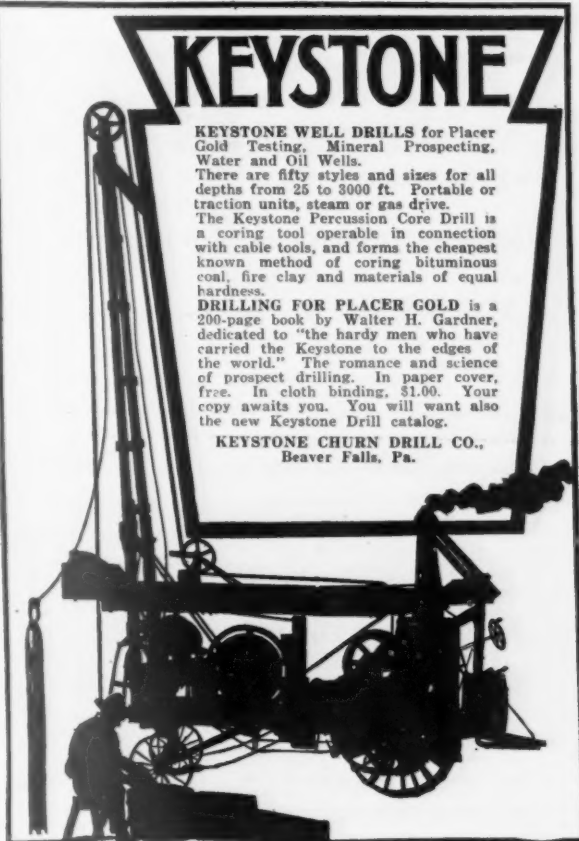
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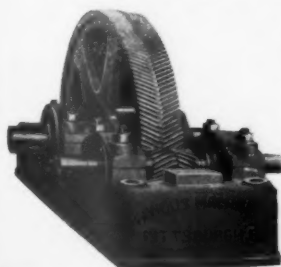
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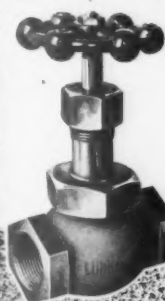
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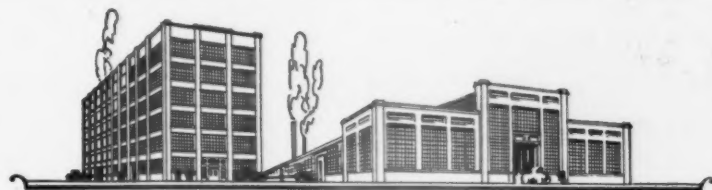
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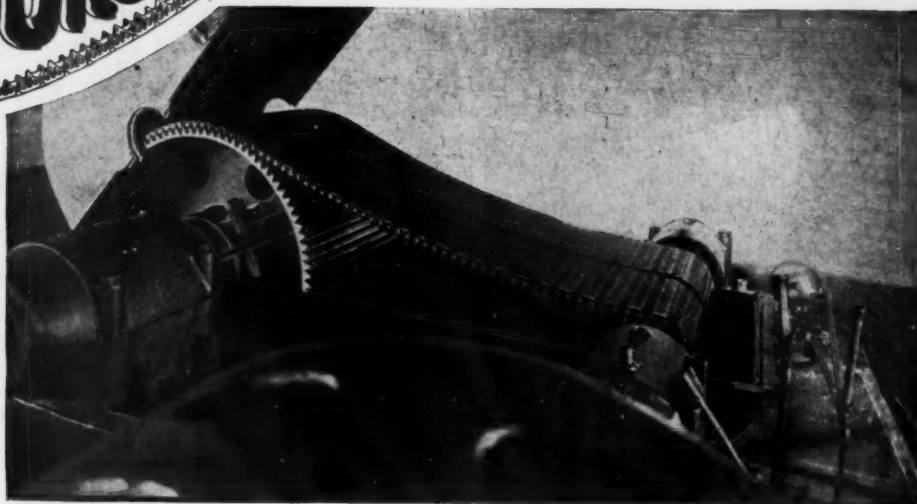
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# SILENT CHAIN DRIVES



300 H. P. Morse Silent Chain driving fan in the mine of the U. S. Fuel Company, Benton, Ill.

## One way to cut coal production costs

Using Morse Silent Chains to drive mine fans, pumps, conveyors and lineshafts is one way to cut coal production costs that results in large dollar and cents savings.

At the Middlefork Mines of the U. S. Fuel Company in Benton, Illinois, the Morse Silent Chain driving the fan is transmitting 98.6 percent of the 300 H. P. developed by the motor. It cannot slip. Running silently and smoothly day after day, it assures unfailing performance and no trouble.

The outstanding feature of a Morse Silent Chain Drive is the patented Rocker-Joint Construction. This substitutes rolling or rocking motion at the joint in place of sliding friction; long life of the drive is thereby assured, and maintenance is reduced to a minimum. Only infrequent lubrication is required.

For complete information, get in touch with the Morse Engineer in your territory—or write us direct.

### MORSE CHAIN CO., ITHACA, N. Y.

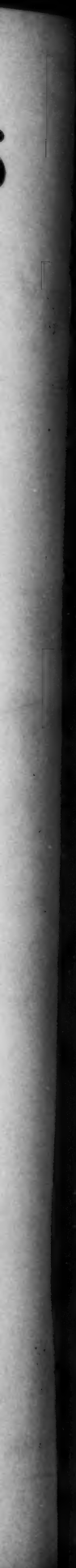
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Do not fail to see our exhibit, Booth 118, at the Coal Equipment Exposition of the American Mining Congress, to be held May 25 to 29, in the Cincinnati Music Hall, Cincinnati, Ohio.





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